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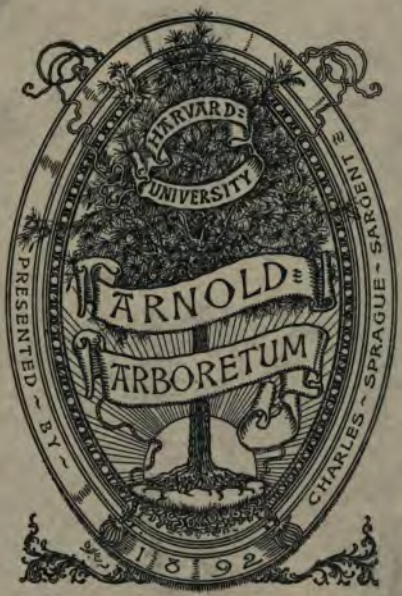

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MANAGEMENT OF CROWN FORESTS

AT THE

CAPE OF GOOD HOPE

UNDER THE OLD REGIME AND UNDER THE NEW.

COMPILED BY

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PREFACE.

BY the present Parliament, and by each of the two immediately preceding Parliaments, Committees have been appointed to enquire into the expediency of establishing a British National School of Forestry. In giving evidence before the Committee appointed in 1866 I gave the following replies to the queries cited:—

Q. 180. '*Chairman*,—You are the author of an interesting work on Forest Science, I believe?—I am the author of several works upon that subject.

Q. 181. 'And you have kindly come here to give the Committee your idea of how or under what conditions a School of Forestry might be established?—Yes. The particular point upon which I can supply information to the Committee is this: I know a good deal of the waste that is going on in our Colonies. I have made myself acquainted with the most advanced forest economy of the day; and I am also acquainted with most of the Schools of Forestry upon the Continent; I have visited several, and I am prepared to state how I consider Scotchmen can be most efficiently, and at the least expense, trained up so as to manage our Colonial forests advantageously. That is the particular point to which I have given attention.

Q. 182. 'But the Committee are principally interested in our home forests?—I am aware of that; but the point upon which I can give information principally is with reference to Colonial forests, which are a large part of the British possessions, as much as India is, upon which much evidence has been already given.

Q. 183. 'The Committee looked forward with great interest to hear your evidence upon this subject; but I think we ought to try and confine ourselves as much as possible first, perhaps, to the necessity of such a school in view of the waste that is being

committed daily; and, secondly, as to what practical steps should be, and are possible to be, taken to make up for that waste, and to raise up a class of men who will enable us to deal with our forests better than they have been dealt with hitherto?—I will endeavour to give my evidence upon that aspect of the case.

Q. 191. 'You are of opinion, are you not, that the management of our forests and woodlands would be much more successfully carried on if there were properly trained foresters to do the work?—I am satisfied that they would be, but simply upon this ground: according to the advanced forest science of the day, there is no hard and fast rule laid down for the management of any forest; but the students in the various schools upon the Continent are thoroughly instructed in all that pertains to the healthful growth of trees, and then they make their own application of the science to the circumstances in which they may be called to act.

Q. 192 'In fact, the establishment of a forest school would, in your judgment, be a great advantage, not only to the Colonies of which you were speaking just now, but also to the mother country?—Very great.

Q. 193. 'You think that a scientific education and a regular course of training on the part of those who have the management of them would very much improve the condition of our woodlands?—Very much.

Q. 184. '*Sir John Lubbock*,—You have had a great deal of experience in South Africa with regard to the forests there, have you not?—Yes; I know the waste which has been going on, and the consequences which have followed that waste.

Q 185 'I believe that when the Cape authorities were in want of a forest officer they had to obtain the services of a French gentleman?—They got a French gentleman to look after their forests, who, when he went to the Colony, could not, it is said, speak a word of English.

Q. 186. 'Naturally they would have preferred to have appointed an Englishman if they could have found one competent?—Decidedly; but there was not such an Englishman to be found.

Q. 187. 'And that would be the case, I daresay, at the present

moment?—It would be the case at the present moment, excepting that there are officials from India who have returned to this country, who might be disposed to go to the Cape as being a healthy settlement; but there is not, so far as I know, an English forester capable of taking the management of the Colonial forests.

Q. 188 'And there are only a very few Indian officials who are at any time available?—Apparently.

Q. 189 'And these the Government would be sorry to lose? —I have no doubt of it.'

In the First Part of the following volume illustrations are supplied of the waste in the Crown forests of the Colony of the Cape of Good Hope, referred to in my answer to Q. 184, and in the Second Part of the volume are given details of what was effected in five years by an educated, trained, and instructed superintendent of forests, though labouring under the disadvantages mentioned in my reply to Q. 185.

In evidence subsequently given by Dr W. Schlich, Inspector-General of Forests to the Government of India, it was stated in reply to Q. 279,—'The Committee have been informed that at the present moment there is a large demand for gentlemen skilled in forestry, and that there is no means of getting them; that in the case of a Colony requiring such persons to take charge of these forests they have been obliged to appoint foreigners through not finding any properly qualified Englishmen to discharge the duty?—That is so to a certain extent; but as far as the Indian Department goes, which has been mentioned in connection with that point, I should be anxious to correct a slight misapprehension by stating that the Indian Government has been most anxious throughout to assist the various Colonies in that direction; and we have sent Indian officers to various parts of the world, to the Cape, the Mauritius, Ceylon, and Cyprus, for example; but these men are always returned to us again, for this simple reason that the Colonists will not offer proper conditions. They want to have the men, and be able to discharge them again at their will and pleasure. At the same time the Government of India, although

ready to help the Colonies, says :—" We cannot let you have experienced men for the best portion of their working time, and then take them back again when they are becoming due for pensions; that is not fair. We will help you, but you must offer those men proper conditions; and if you want them for any length of time you must take them on permanently." The result up to the present day, with one single exception, has been that the men always return to us; but we have been always ready to let the Colonies have the men if they will take them on permanently.'

And in reply to subsequent queries he gave additional evidence in regard to the position taken in this matter by the Indian Government. Amongst others, this :—

Q. 283. 'The Indian Government have not more men than they require?—We have no more men than we require; but we have been always willing to give men when asked for them.

Q. 284. 'That has been as a matter of courtesy and consideration to the Colonies; but you yourselves have not had more men than you required for your own purpose?—I state distinctly that we do not wish to give those men up, but that we have been always ready to do so when asked under reasonable conditions.'

In view of facts and figures given in Parts I. and II. of the following volume, and a comparison of these, it may be questioned whether the parsimony of the Colonial authorities referred to by Dr Schlich was true economy, and did not rather come under the character of what Scotsmen call being penny wise and pound foolish.

Part I. shows a waste of forest produce having gone on at the Cape under the old regime greatly exceeding in money value the amount of the revenue received from the forests, and that the revenue was not great, being in 1862 about £250. While Part II. contains statements by the superintendent of the forests to the effect that in the year 1882, after two years' management under the new regime, the gross revenue was £7680 14s.; and that the forests of the Colony, if properly managed, might yield a revenue of at least £235,000.

And this enormous increase of revenue is only one of several co-related benefits obtained under the new regime, some of which are only indicated, not detailed, in the reports cited.

Of the extent to which parsimony, apart from all idea of recklessness or imprudence, may account for the management of the same forests under the old regime, illustrations are supplied in Part III. of the volume.

The details given are copious. They are so because I design my Treatise to be, in some respects, like to a clinical lecture, teaching from a particular case, supplying at once well defined indications of disease, explicit statements in regard to the remedial measures followed, official statements in regard to results obtained, and facilities for indicating the cause or occasion of the evil remedied.

I have prepared a similar account of Sylviculture at the Cape of Good Hope under the old regime and under the new. it is equally with this illustrative of the advantages which have thus been secured, declarative of what has been done there, and suggestive of what might be done elsewhere.

I have arranged that should any British Colony, or any American State, or any private individual, desire 50 copies for distribution, they may be supplied with these at a reduction of 25 per cent., or one-fourth of the retail price, or 100 copies at a reduction of $33\frac{1}{3}$ per cent., or one-third of that price.

JOHN C. BROWN.

HADDINGTON, 21*st July*, 1887.

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MANAGEMENT OF CROWN FORESTS

AT THE

CAPE OF GOOD HOPE

UNDER THE OLD REGIME AND UNDER THE NEW.

INTRODUCTION.

In the beginning of 1863 I was invited to the Cape of Good Hope to accept the appointment of Colonial Botanist, to which was attached a salary of £300, with an allowance of £100 for travelling expenses, and the honorary appointment of Professor of Botany in the South African College—honorary in as much as there was no salary or allowance attached to the appointment, and no fees were chargeable to students. Attendance on the part of these at lectures on botany was optional, while no certificate of attendance on the class, or examination in botany, was required for any engagement in the Colony, or for college honours, and the delivery of lectures was virtually optional with me, no lectures being required of me unless a certain number of students—I think 12—presented themselves for study. I had previously spent some years in the Colony in the discharge of certain duties at the instance of the London Missionary Society, though not at the expense of the Society; I was not unknown in the Colony, and the Colony, throughout a great extent of its area, was not unknown to me, and I accepted the invitation.

The office of Colonial Botanist had been created some years before with the twofold object—1st. Of ascertaining and making generally known the economic resources of the Colony as regards its indigenous vegetable productions, and its fitness for the growth of valuable exotic trees and other plants; and 2nd, Of perfecting our knowledge of the flora of South Africa, and thus contributing to the advance of botanical science.

Within a few months after my appointment to this office I made the tour of the forest districts of the Colony and of British Kaffraria, then a separate dependency of Great Britain, but subsequently constituted a division of the Colony.

It was thus that I was led to give consideration to the condition of the forests of the Colony, to the treatment to which they had been and were being subjected, to disastrous consequences which had made themselves apparent, and to means by which a more satisfactory treatment of the remaining forests might be secured, the disastrous consequences of the mismanagement of these might be prevented, and disastrous consequences of what had been done might be averted.

In the Colony of the Cape of Good Hope, as in many other places, it is customary to destroy old, withered, and dry vegetation by fire, to clear the ground, and promote the production of new succulent shoots to supply preferable nutritious food for flocks and herds, upon the increase and rearing of which most of the rural population are dependent for the means of support, the conditions of the Colony throughout extensive regions being more suitable for pastoral than for agricultural industries.

The practice is detrimental, as well as conductive to the prosperity of the Colony, and I believe more so. Be this as it may, it would be well, if practicable, to counteract the evil, while securing the good. One of the evil effects following the practice there, directly and indirectly, is the desiccation of soil and climate. This is not the only one; but this evil might to some extent be counteracted by the maintenance and extensive creation of forests. This is not the only means of counteracting the evil which we have at command, but it is that

which chiefly concerns us here. And having made an extensive tour through forests and forest lands of the Colony, and regions beyond, on my return to Capetown I submitted to the Government a memoir on the conservation and extension of forests as a means of counteracting disastrous consequences following the destruction of bush and herbage by fire; in which were embodied detailed statements of great waste of forest products, and apparently reckless destruction of forests, and of consequent disastrous consequences to the climatic condition of the country.

Having submitted this memoir to the Government I proceeded, in anticipation of subsequent discussion which might arise, to make myself acquainted with what could be learned in regard to the previous management of forests in the Colony.

Many indications of the former existence of forests in South Africa on grounds now devoid of trees and arborescent vegetation of every kind, came under my attention, and notices by travellers and resident missionaries and others, both within and beyond the Colony, of the gradual disappearance of some of these, and of proceedings by which this was brought about. Of these I have given details in a volume entitled *Hydrology of South Africa; or Details of the Former Hydrographic Condition of the Cape of Good Hope, and of Causes of its Present Aridity, with Suggestions of ppropriate Remedies for this Aridity.** In

* *Hydrology of South Africa; or Details of the Former Hydrographic Condition of the Cape of Good Hope, and of Causes of its Present Aridity, with Suggestions of Appropriate Remedies for this Aridity.* In this the desiccation of South Africa, from pre-Adamic times to the present day, is traced by indications supplied by geological formations, by the physical geography or the general contour of the country, and by arborescent productions in the interior, with results confirmatory of the opinion that the appropriate remedies are irrigation, arboriculture, and an improved forest economy: or the erection of dams to prevent the escape of a portion of the rainfall to the sea—the abandonment or restriction of the burning of the herbage and bush in connection with pastoral and agricultural operations—the conservation and extension of existing forests—and the adoption of measures similar to the *reboisement* and *gazonnement* carried out in France, with a view to prevent the formation of torrents, and the destruction of property occasioned by them.

this volume I have given details of forest fires occasioning destruction of forests and plantations valued at thousands of pounds—in one case at Constation, near Wynberg, valued at £10,000, in another near Humansdorp, according to one estimate at £25,000, according to another at £30,000. In another case the smoke was conveyed some hundred and twenty miles in a compact volume, seven or eight miles in extent; and in a fourth case an area of 400 miles long, varying in breadth from 15 to 150 miles, was devastated by the fire.

There is reason to believe that in all of these cases the extensive destruction of forests was a consequence of the practice of burning the veldt. Information in regard to the effect of such denudation in increasing the humidity of the climate, and the effect which the conservation and extension of forests might have in counteracting such disastrous consequences, I have detailed in a volume entitled *Forests and Moisture.**

With regard to devastations occasioned by inundations I had occasion to state in the Preface to another volume, one entitled *Reboisement in France; or Records of the Re-planting of the Alps, the Cevennes, and the Pyrennes, with Trees, Herbage, and Bush, with a view to arresting and preventing the destructive consequences and effects of Torrents:*—†

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* *Forests and Moisture; or Effects of Forests on Humidity of Climate.* In this are given details of phenomena of vegetation on which the meteorological effects of forests affecting the humidity of climate depend—of the effects of forests on the humidity of the atmosphere, and on the humidity of the ground, on marshes, on the moisture of a wide expanse of country, on the local rainfall, and on rivers—and of the correspondence between the distribution of the rainfall and of forests—the measure of correspondence between the distribution of the rainfall and that of forests—the distribution of the rainfall dependent on geographical position, or determined by the contour of a country—the distribution of forests affected by the distribution of the rainfall and the local effects of forests on the distribution of the rainfall within the forest district.

† *Reboisement in France; or Records of the Re-planting of the Alps, the Cevennes, and the Pyrenees, with Trees, Herbage, and Bush, with a view to arresting and preventing the destructive consequences of Torrents.* In this are given a *résume* of Surell's study of Alpine torrents, of the literature of France relative to Alpine torrents, and of remedial measures which have been

'I have before me details of destructive effects of torrents which have occurred since I left the Colony in the beginning of 1867. Towards the close of that year there occurred one, the damage occasioned by which to roads and to house property at Port Elizabeth alone was estimated at from £25,000 to £30,000. Within a year thereafter a similar destructive torrent occurred at Natal, in regard to which it was stated that the damage done to public works alone was estimated at £50,000, and the loss to private persons was estimated variously from £50,000 to £100,000. In the following year, 1869, a torrent in the Western Province occasioned the fall of a railway bridge, which issued in loss of life and loss of property, and personal injuries, for one case alone of which the railway proprietors were prosecuted for damages amounting to £5000. In Beaufort West a deluge of rain washed down the dam, and the next year the town was flooded by the waters of the Gamka; and the next year, 1871, Victoria West was visited with a similar disaster. Such are the sums and the damages with which we have to deal in connection with this question, as it affects the case; and these are only the most remarkable torrents of the several years referred to.

'Towards the close of last year, 1874, still more disastrous effects were produced by torrential floods. According to the report given by one of the Colonial newspapers, the damages done could not be estimated at much less than £300,000. According to the report given by another, the damage done to public works alone was estimated at £350,000.'

In the volume I have first cited I have given details of extensive destruction of forests in South Africa, by man's recklessness in the use of the axe, and his recklessness in making use of fire clearing, have specified mountains, districts of considerable extent, and in some cases

proposed for adoption to prevent the disastrous consequences following from them—translations of documents and enactments, showing what legislative and executive measures have been taken by the Government of France in connection with *reboisement* as a remedial application against destructive torrents—and details in regard to the past, present, and prospective aspects of the work.

whole regions, devasted of every vestige of a forest, with the result that where once there were, according to traditions, and according to the aspect of the country, genial showers, and perennial streams, and abundance of food for man and beast, the characteristic of the climate is now an alternation of severe and long-continued droughts and deluges of rain—the former prevailing ofttimes for years, reminding one of 'the word of the Lord that came to Jeremiah concerning the dearth: Judah mourneth, and the gates thereof languish; they are black unto the ground; and the cry of Jerusalem is gone up. And their nobles have sent their little ones to the water; they came to the pits and found no water; they returned with their vessels empty; they were ashamed and confounded, and covered their heads. Because the ground is chapt, for there was no rain in the earth, the plowmen were ashamed, they covered their heads. Yea, the hind also calved in the field, and forsook it, because there was no grass. And the wild asses did stand in the high places, they snuffed up the wind like dragons; their eyes did fail, because there was no grass.' And reminding one of another incident in Hebrew history, when it rained not upon the earth for a period of six years and three months,* and while such were the droughts, not unfrequently the deluges of rain gave rise to inundations, destructive both to life and property.

In the concluding sentences of the volume I say:—'I have given Colonial estimates of the loss occasioned by fire and flood during the last eight years, which would show that loss to have been about £100,000 per annum.'

In the following chapters of this volume I give only details of the economic management of forests in South Africa; but I deem it expedient previously to refer to these facts, in as much as the conservation of forests against destruction by fire pertains to the economic management of forests as really as does the conservation of them against malversations and thefts; and the climatic effects of forests, equally with forest products, demand attention in forest management.

* 1st Kings xviii. James v. 17.

PART I.

MANAGEMENT OF CROWN FORESTS AT THE CAPE OF GOOD HOPE UNDER THE OLD REGIME.

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CHAPTER I.

MANAGEMENT OF THE FORESTS PREVIOUS TO THE CLOSE OF THE FIRST HALF OF THE PRESENT CENTURY.

In regard to the management of Crown forests by the Government of the Colony in the last century I have learned but little. There was made to me a vague statement that one of the Dutch Governors of the Cape ordered that in thinly wooded districts every farmer on felling a tree should plant two saplings to grow in its stead.

I learned that in Instructions given by the Batavian Government to the Landrost of George in 1805 it is stated: 'The planting of timber, and the preservation of the present forests, shall also be encouraged, as wood becomes daily more wanted, both for building and for fuel.'

In 1806 the Colony was ceded to the British.

There appears to have been for some time a tax of one rix-dollar a load levied for the George forests, the proceeds of which went towards the building of the Dutch Reformed Church in George.

In 1811 the forest in Plettenberg Bay was reserved for the use of the naval building yards, and in 1812 a large section of the forest in that neighbourhood was closed altogether, fear having been expressed relative to the increasing scarcity of timber. In this year—1812—an office designated Inspector-General of Lands and Forests appears to have been held by Baron von Collet D'Escury; but I have not succeeded in learning what his functions were, or in what way the Crown

forests were then treated; all that I have learned is that there is preserved in the office of the Secretary-General some documents indicative of the fact.

In the same year—1812—Captain Jones of the Royal Navy was commissioned to investigate and report to the Admiralty on uses which might be made in shipbuilding of trees growing in the forests of the Kynsna, and in the district around, on the number of trees there of different kinds, and on the facilities existing for procuring and transporting to Plettenberg Bay what might be required for such purpose. Fragments of his report I found at different times and different places at the Cape of Good Hope; not a little of the information existing in the Colony in regard to the natural history and physical properties of the woods of these forests had apparently been derived from this report; and I succeeded at last, through the good services of others, in procuring a copy of it which had been preserved by Mr Rex, resident at the Kynsna. It is dated 1st November, 1812, and is as follows:—

Report upon the Forests, and Timber growing therein, in the vicinity of Plettenberg Bay, together with the means of removing it therefrom to the Bay for shipping.

'Of the forests in the vicinity of Plettenberg Bay the most erroneous and unfounded reports have hitherto been made, either by people who were never on the spot, but collected their information from others equally ignorant as themselves, and from others, who though on the spot, were not qualified to judge, or by those who took not the pains to examine their nature, extent, and situation, but from a superficial view, and without any knowledge of the various sorts and qualities of the timber they contained, pronounced them at once inexhaustible.

'After a residence of twelve months on the spot, after having attending and minutely surveyed these forests for an estimated extent of sixty English miles, but more particularly in the vicinity of Plettenberg Bay, I have penetrated deeply in various parts and directions, attended by the most able and experienced wood-cutters residing there. Their opinions I have individually collected, and though they differ in some respects yet in the main point they agree

unanimously that a scarcity of good and useful timber already prevails in the accessible parts of the forests; but not trusting to them alone I have examined everything myself as far as possible, and experience proves to me the truth of their assertions.

'These forests are by no means so extensive as has been reported, and I am requested by the resident, Mr J. F. Meeding, to contradict the assertion said to have been made by him that they were between 300 and 400 miles in length.

'They commence at some distance on this side of the Gaurits River, and extend eastwards to the Erste, or first river, situated directly under Pic Formosa, or the Grenadier's Cap, about 120 miles in a right line, and are confined between a chain of mountains parallel to the sea, and distant from it in a mean, between 8 and 9 miles. Between the Gourits and Knysna Rivers they are generally no more than a belt at the foot of the mountains, from half a mile to a mile in breadth, and very large tracts of naked land often interpose. In some parts there are patches between the mountains and the sea, and along every river they continue for a small breadth on either side to the sea, which, as the timber approaches it, becomes less. They are very inconsiderable, either in extent or size of the timber, till near the Kaayman's River in Outeniqua land, between which and the Knysna River in Plettenberg Bay district nature has placed insurmountable barriers to the removal of heavy timber.

'That part of the forests therefore from which supplies may be expected commences at the Kaayman's River, and westward of it, which must go to Mossel Bay, distant about 42 English miles of very rugged roads; and from the Knysna River eastward to the Ship Timber River, so named by Colonel Collins, which falls into the Plettenberg Bay, all of which must come to the said Bay for shipping. And here the forests abound in kloofs and deep ravines, such as no person would conceive from an outward view, or unless he penetrated into them; and altogether they present innumerable obstacles to the transport of heavy timber, and greatly enhance its price.

'Nor indeed is it possible to obtain it very far inwards on this account. The paths of the wood-cutters are generally running along a ridge between two of these kloofs, from which they strike right and left as far down as they can slip the timber from. . . .

'Nor are these to be found here forests consisting only of stinkwood, but they are composed of from 30 to 40 various sorts of

timber of different sizes, and of which yellow wood forms I should think one-half part of the whole. Stinkwood can only be ranked as fifth or sixth in quantity, and of that which stands a very considerable portion is decayed, and on that account passed by the wood-cutters.

'The soil of these forests is extremely rich, being composed of vegetable matter, perpetually renewed by decayed trees and leaves, and, towards the mountains, of the loose earth washed from them. The consequence is a luxuriant growth of the timber, which, standing very thick, shoots up to a very great height, and it is mostly straight.

'From Plettenberg Bay the nearest point of the forest is about 10 or 12 miles, and I estimate the land covered with timber between the Knysna and Keurbooms River at most about 30 square miles, of which not more than one-fifth part can be got at or used to remove timber from. On the eastern side of the Keurbooms River there is a forest at the feet of the mountains about a half or three-quarters of a mile broad, and four or five miles in length. Here grow the greatest quantity and largest stinkwood trees that I have seen by far, nor does it abound with such difficulties as ravines, &c., but to compensate for this the distance is much greater, and the roads to the Bay infinitely worse; and the Keurbooms River, so far from being of any service, adds much to the impediments, in fact causes the greatest.

'The timber reported to be standing on the banks of this river so easy to be removed is not to be found; a small quantity only has been cut out from one of the kloofs; but contrary to what has been stated to us, it is ten miles from the river by any practicable road. I find it to be generally the case that as I approach the mountains there is a greater proportion of stinkwood; but again that is much inferior in quality, being shaky, and having what the Boers term the spider-web heart.

'For twenty-five years past stinkwood has been cut in the vicinity of Plettenberg Bay, and to a great extent much of that which remains is either decayed, or would not suit the purposes then desired, except, as I before observed, towards the mountains, from which again the difficulty of removing it becomes greater. Planks of a great thickness, and of a great parallel breadth, were continually required by the Batavian Government, to obtain which the very best trees were sought after and felled.

'The party of people under my direction I could nowhere employ in cutting stinkwood only, particularly having plank to saw, except in the forest at Buffalo River on the eastern side of the Keurbooms River, and to transport the timber from which to the Bay for shipping, independent of rafting it over the Keurbooms River, which had to be performed by my own people. The Landrost of the district, by an order from the Colonial Government, has affixed the price at 20 dollars, or £4 currency, for a freight of 55 cubic feet of stinkwood. The method of getting the timber out of the forest is by slipping it on the ground with oxen, and from 24 to 28 oxen have been necessary to drag out several pieces delivered to me on contract. A path must be made for every individual tree, from the spot where it falls to the great slipping path; nor, from the nature of the forest, can any other method be adopted to facilitate the removal of it. In forests on the western side of the Keurbooms River, a party of 6 or 8 men are sufficient to be together; and in this manner must a number of people be dispersed all round the edges of the forest.

'In sawing plank it must be done on the spot where the tree falls, as those fit for this purpose are much too heavy to be removed by any force that can be applied to them; and in no place that I have seen is there sufficient stinkwood to employ one pair of sawyers except at Buffalo River. The distance from one tree to another, from which paths must be cut to carry the sheers, tressels, &c., to raise the blocks with and saw them on, would render the business so dilatory and unproductive as by no means to answer the expense attending it at Buffalo River.

'In timber felling it is found that the trees required for this purpose stand tolerably thick; and the party proceed from one to the other, clearing their way as they go; and notwithstanding every care and precaution taken to avoid the heart-shake, we are often deceived, and both time and labour are thrown away.

'I am of opinion that a party of twelve pair of sawyers, and twenty shipwrights to side up such logs as were not fit for planks, would entirely clear the forest at Buffalo River in three years of such stinkwood timber as is good.

'Eastward of the Ship Timber River, which is about 7 or 8 miles east of the Keurbooms, commences the Zitzikkama forests; and I am informed that there stands the most magnificent timber (stinkwood) forests. A variety of circumstances has prevented me hitherto from making a survey of this spot, as it is necessary that I should have

people well acquainted with the place to accompany me, and a person I had once engaged was prevented by his attendance being required on commando.

'I now wait for the proper season again. But I am also informed by those well acquainted with the place, and allowed among the Boers to be some of the first waggon drivers, that it is utterly impossible to remove the timber to the Bay—that it is beyond the power of oxen to drag it up the precipices.

'No formal system has ever prevailed in respect to cutting timber; but those who intended to do this pitched on what spot they pleased and commenced work. Thus the whole extent of the forest in this neighbourhood have been at once made use of; and the consequence is, as will ever happen to any resources howsoever great, unless husbanded, that the scarcity now spoken of has taken place.

'To a casual observer there now appears in every direction immense numbers of trees, but they are not aware that the experience of the wood-cutters leads them to pass them by, though standing in situations very convenient for removal.

'The fall of one large tree in these forests causes much destruction to those around, and the tops being all suffered to remain, very much impede the growth of the succession. But the wood-cutter has no demand for this kind, nor would it pay him if he had, without a great price for his time and labour expended in cutting it up; and from the nature of the forests no waggons can be taken into them to bring out such small wood, as such numerous difficulties abound in the transport of heavy timber by land.

'I come next to consider of the means of so doing by the rivers, which have been also reported as giving the greatest facility towards this.

'These rivers are certainly very numerous; but when I observe they mostly flow from the before mentioned range of mountains at about 8 or 9 miles only from the sea, and having, ere they reach it, to fall I conceive at least 2000 feet, it will be deemed a geographical reason sufficient to prove how erroneous the reports have been.

'The rivers are in fact no more than torrents of water, until very near their mouths, confined between tremendous steep and lofty precipices, tumbling over rocky beds, and in rainy seasons hurrying everything along with an impetuosity scarcely to be conceived. The mouths of most are blocked up with bars of shifting quick sands, on

which at all times a heavy surf breaks, and I am sure were every convenience within reach to get timber into the waters it would be utterly impossible, with safety and certainty, to float it out, the sand rising with the water, so that there is no depth of the latter at any time, while the strength of the surf would break any raft to pieces, and force the logs on the strand.

'The Keurbooms River is an exception to the others, as it penetrates through this range of mountains, and is the most considerable by far along the coast. Its mouth is directly in the bottom of Plettenberg Bay, and like the others is blocked up with a bar of quick sand on which at the stillest times a heavy surf also breaks. Mr Clarke's statement of the several thousand tons of timber growing on the first 12 miles of the banks of this river is void of any foundation. That gentleman was never here, but collected his information from those that knew as little as himself.

'The banks of this river at about 1 or 1½ miles from the sea, rise to a height not less in my judgment than 800 feet in many places nearly perpendicular, and mostly directly from the water, which is tolerably deep. In some bendings of the river are small flat places on which grow a few Outeniqua yellow wood trees that are useless; and there are are two kloofs, where their rivers run into this, from one of which a small quantity of timber has been cut.

'Having twice been up in a flat boat, I can testify it is not possible to go any higher than about 6 or 7 miles at the utmost. Immediately within the mouth it forms a lake, across which such timber as is cut on the eastern side must be floated to the Government's post, and then transported on waggons to the Bay for shipping.

'Thus so far from the rivers of this country being beneficial to remove the timber, that they absolutely cause the greatest impediments to it by the steepness of their banks, and the ruggedness of their channels.

'I have crossed and examined 14 of the most considerable in various places where it is possible to do so; and as to lying at anchor before their mouths, as has likewise been asserted practicable by a naval officer, in my humble opinion I should conceive that man mad who should attempt such a thing. The anchorage in Plettenberg Bay is not considered safe, and here ships are sheltered from the heavy S.W. winds; how must the danger then increase when on a rocky coast, and exposed to the whole fury of the vast

Southern Ocean, with inevitable destruction staring the crew in the face should the ship part from her anchors, or be unable to ride longer at them.

'I have also paid much attention to the mouth of the Knysna Lake, which is a secure place for ships to be in and load, were but the passage practicable, and singular from every other opening for water along this coast. It is a deep rocky and abrupt channel, about 250 yards wide I think in the narrowest part. The precipice on the eastern side is about 300 feet high, and overhanging that on the western side double its height, but not so steep; and I have reason to think there is a bar across, just on the outside, as I saw the surf at low water break very heavy on one particular spot.

'To attempt this channel, which is much lengthened by rocks extending on both sides some distance outwards, a ship must have a variety of favourable circumstances, to await for which she must keep the sea, and on a rocky sea-shore; and there is always a heavy swell in the channel, and the danger of attempting such narrow passages between high lands, even with all favourable circumstances, is well known to seamen.

'I have the opinion of a master of a ship who has for many years navigated the coast, and is well acquainted with all the Bays, &c., that the Knysna is a place to which a ship should only attempt to run as a chance of saving her crew, when it was found nothing could save her from going on shore.

'Plettenberg Bay is entirely open to the south-east winds, which sometimes blow with such violence that no vessel can possibly ride at her anchors, but must come on shore.

'Ships lie at anchor about 1½ or 2 miles from the shore. It often happens that nothing can be done for a week together on account of the surf, and ships should be well found that come to take in timber. The stinkwood that will not float is exceedingly troublesome to get off, and renders the operation very slow.

'Mossel Bay possesses much superior advantages in this respect; the Mossel Bay's anchorage is more secure, very near the shore, and it is but seldom that a boat cannot land or timber be rafted. But then Mossel Bay is a great distance from the forests, as I before mentioned, about 42 miles and the road very bad.

'The price of labour in Plettenberg Bay is extremely dear on account of the sums the Boers must give for a slave who is a wood-

cutter, from 1,600 even so high as 2,300 dollars, they cannot therefore deliver timber more reasonably, especially when the great advance in the price of oxen, &c., of late years is taken into consideration.

'Nor would the method proposed by Mr Clarke of sending English sawyers into the forest reduce the price of sawing, which is here performed by three men—two being in the pit: since it is evident that if the Boers could not have what they demanded for plank, they would turn their attention to that which would pay them better, and reimburse them for the cost of their slaves.

'Another cause is the emigration of the Hottentot natives, many of whom are excellent wood-cutters, from this district to the Missionary Institution, so that very few now remain, and the Boers are greatly embarrassed for want of hands to perform their work.

'The population is very small in this district, and I have never been able to hire a single workman, having only once had an offer from a Boer of himself and four men for 11 dollars, or £2 4s currency per diem.

'The expense of stinkwood timber on an average of all sorts, and ready in the bay for shipping, is, according to my present contracts with the Boers, about 3s 10d currency per cubic foot.

'The prices, as well as the qualifications to the timber given by Mr Clarke, had no more foundation than the rest of that gentleman's report concerning these forests.

'This expense, I have reason to think, will speedily increase from the necessity of going deeper into the forest to obtain the timber

'I come now to speak of timber of which these forests are composed, of which there is between thirty and forty different kinds, and of these stinkwood is unquestionably, on every account, the first in importance.'

There follows a detailed report on the adaption of the following timber for purposes connected with shipbuilding, giving the weight of the timber, when felled, and when dried :—

Stinkwood, white, red, and black.	Iron wood.
Yellowwood, upright and Outeniqua.	Assegai wood.
Els or alder, red and white.	Saffron wood.
Essen or ash, white and rock.	Pear wood, hard and white.

Vlur or alderwood.	White wood.
Swart bast.	Speck or porkwood.
Swart hout	Benken or Cape Beech.
Zyde bast.	Wilde Castange or chesnut.
Kamassie wood.	Keurboom.
Rood or red wood.	Oliven or olive wood.
Kasha wood.	Melkhout.
Kersen hout.	Sally or wild sage.
Paardepis.	

And he proceeds:—'Of the above-mentioned kinds of timber the four last named never grow in the great forest, but on the verge of it, or in small kloofs or glens. There are several other kinds of small trees which cannot be called timber, and are too inconsiderable for notice; and also several varieties of saffron, kersen, and other kinds of wood, bearing different names, but which, as being of the same qualities, I have comprehended under the general one.

'From the account given it appears decidedly that there is only one kind of timber valuable for shipbuilding, viz., stinkwood, and this is not in such quantities as to render it likely to obtain a permanent and regular supply. A small proportion may be occasionally had, but the wood-cutters already acquaint me that they are obliged to seek far and deep in the forests to obtain that suitable for their contract with me. This alludes to those forests on the western side of the Keurbooms River. The general character of the woods may be called hard and tough, but shaky; which last quality I attribute in some measure to the strength of the wood, and height of the trees. The local difficulties of this country are insurmountable, at least with its present small population. The roads, except from the Poorte forest, situated between the Knysna and the Keurbooms River, which are very good to Plettenberg Bay, are a constant succession of ascending and decending heights; nor is the labour of men to make them better effectual and lasting, since the first heavy rain renders them as bad as ever. On this account I consider it totally impossible to remove any heavy timber from the forests situated between the Knysna and Kaymans Rivers. The latter is accounted the most difficult pass in Southern Africa. I should think it cannot be less than 600 or 700 feet deep to the river, and

the road is for a considerable part over rocks, like steps from two to three feet in height, down which the waggon jumps, with three wheels locked, and the angle of descent and ascent is often 45 degrees, the length of the team of oxen only enabling them to get up.

'It is the custom of the Boers who cut and carry away wood over this pass to the Cape to unload half the freight, which is generally about 3000 lb. weight, and then proceed over with one moiety returning to fetch the other. In this business a day is often consumed, and many waggons broken.

'For the manufacture of staves the timber in general use in the Colony is the upright yellow wood, which cleaves well. The ash is too soft and porous for the purpose I think, and I am apprehensive, from the qualities and nature of the yellow wood, that though it may answer very well for casks always free from exposure to various kinds of weather and situation it will not do for those subject to either one or the other, or that are likely to be shut up in the heat of a ship's hold.

'The contract now entered into by several persons with the Colonial Government for the supply of salt beef to be cured in the Colony, and for the casks to pack which the staves will all be of yellow wood, will prove how far durable they may be in the various situations to which they will become liable. The stinkwood, from its not cleaving, cannot well answer the purpose, nor do I find there is any kind of wood growing in this part of the country of importance for this article in the view of forming an establishment here.

'For cutting timber several things must be considered. It will be necessary that the Government should have everything of their own for the purpose of removing the timber, as well as for every circumstance connected with the business. From a variety of causes no dependence whatsoever can be placed on the Boers towards effecting any part of it. There must be therefore shipwrights, hewers, sawyers, smiths, waggon makers, waggons, drivers, and leaders for the oxen. The waggons being the property of Government, there must be men to make and keep them in repair, both for the wood and iron work.

'Food for oxen is also of great importance, and to be considered. An establishment of 40 or 50 men would at least employ 10 or 12

waggons, for which in constant employment there must not be less than 64 oxen, or 4 span for each waggon, besides those necessary for slipping and various other purposes; and from the destruction that happens among these cattle by accident and by wolves, not less than 1000 head of draught oxen in all would be wanted.

'To keep these in order for work Government must hold in their possession at least three of the loan places where there is good grass, that on the flat being insufficent to keep the number of oxen already employed by the wood-cutters, many of whom have also loan places where they occasionally send them, or they pay so much per year to one who has or can feed a few of them; and notwithstanding this I understand a number of cattle have died this year from want of food, occasioned by the excessive drought that prevailed from April until September. The expense of each draught ox may be reckoned about 30 dollars, or £6 currency. And 50 rix dollars is frequently given for each of the leaders and also for shaft oxen, whose duty it is to bear the weight of the waggons on their horns when descending a steep; while 25 dollars is the general price for the intermediate ones. The cost of the three loan places, taking those in the vicinity of Plettenberg's Bay, which have good grass, and which I have enquired the price of, would be about 13,600 rix dollars

'Another subject, one of yet greater importance to consider, would be how to obtain provisions for such a number of people. In the Plettenberg's Bay there grows scarcely corn enough for the supply of its few inhabitants. The Boers having so small a number of people to till the ground, and being also generally occupied in wood-cutting, are often obliged to take long and heavy journeys of 10 days for a load of corn or meal. This they generally do into the Lange Kloof, where it is much more abundant, and from whence also come the sheep. It is from the Lange Kloof then on which dependence for provisions must be placed; and under the most favourable circumstances a waggon cannot go and return under 8 or 10 days, as I am informed.

'The price of a muid of corn, about 3½ English bushels, on the spot, is generally about 4 dollars, or 16 shillings currency, a sheep from 2½ or 3 dollars, and they seldom weigh more than 40 lbs. each when cleaned. There is a general scarcity in Plettenberg's Bay this year, and the people are much distressed to obtain provisions; and there is but a melancholy prospect for the year ensuing. To guard against

any accident of this kind it would be necessary always to have in store a quantity of salt provisions.

'The party of people under my direction have lived on salt provisions the whole time; nor can I obtain for them a constant supply of fresh meat, bread, and vegetables, if I would give treble their value.

'I subjoin to this a list of the woods mentioned in this report, with the weight expressed against each taken in cubes of 6 inch square when just felled, and weighed at regular periods of 30 days afterwards successively, which cubes, shrinking considerably in drying, were reduced when completely dry to 4 inches square, and gave the real weight of a cubic foot of either kind of wood as is expressed in the last column.

'Of the upright and Outeniqua yellow wood the weights given are the greatest, and the least I found of both sorts, the difference in the latter being remarkable: of this the heaviest when green becomes the lighest when dry. The great loss in weight of most kinds in the first 30 days will show what a quantity of sap there generally is in the timber of this country; but it may be proper to observe that they were obtained as soon as possible after my arrival here, which was as the spring of the year came on.

'The following proportions are those which I consider the timber in these forests bear to each other in a whole, consisting of twenty parts, both as to the number of trees and the cubical contents.

'The proportional number of the different kinds of trees were as follows:—

Yellow wood, both kinds,	8	parts.
White Else,	3	,,
Iron wood,	1½	,,
Stinkwood,	½	,,
Assagai wood,	½	,,
All other kinds,	6½	,,
	20	parts.

'The proportional cubical contents were as follows:—

Yellow wood, both kinds,	10	parts.
White Else,	3	,,
Iron wood,	1½	,,
Stinkwood,	1	,,
Assagai wood,	½	,,
All other kinds,	4	,,
	20	parts.

'Plettenberg Bay, 1st *November*, 1812.

'(Signed) A. F. JONES.'

There follows the tabular statement of the weights of the different woods referred to; and there is subjoined the following statement:—

'An estimate of the quantity of timber and planks, which can be cut and provided by the party of the people at present under my direction, consisting of 4 shipwrights, 1 pair of sawyers, and 16 black labourers, in twelve calendar months, with the expense per cubic foot, when ready in Plettenberg Bay for shipping of the timber and plank.

Sided timber, ...	280 loads.
Thick stuff and planks, ...	80 ,,
Total, ...	360 loads.

	£	s.	d.
Wages for the above-mentioned shipwrights and sawyer for 312 days, averaging together per man per diem, 9s, ...	842	8	0
For the 16 black labourers, for wages, provisions, &c., per man per diem, 2s, ...	499	4	0
Carriage of provisions for the whole party from Plettenberg Bay to Buffalo River, ...	60	0	0
Carriage of 360 loads of timber and plank from Buffalo River to Plettenberg Bay at per freight of 50 cubic feet, £3 12s 9d, ...	1309	10	0
Transport of the same 360 loads by Government people across the Keurbooms River at per load of 50 cubic feet, 8s, ...	144	0	0
For rope, nail, boat, and other incidental expenses, attending do., ...	50	0	0
For tools of various description furnished by Government, ...	50	0	0
	£2955	2	0

The proportion then is for timbers, ...	£1788 0 0
,, ,, plank, ...	1167 0 0

'And the expense per foot is as follows:—

For 14,000 feet of sided timber,	£1788, or 2s 6¼d	per cubic foot.
,, 4000 ,, thickest and plank,	1167, or 5s 1d	,,

'This proportion is calculated upon a fair average value of timber, which I at present receive from the Boers on contract, and of that which I thought fair also to affix to the plank.

'The same timber and plank by contract, according to the above-mentioned average prices, would come to the expense as follows:—

To 14,000 feet of sided timber, 3s 6d per foot, ...	£2450	0	0
4000 feet of thickest and plank, averaging that from 4 to 10 inches thick, ...	1600	0	0
Total, ...	£4050	0	0
Government expenses, ...	2955	2	0
Difference in favour of Government, ...	£1094	18	0

'PLETTENBERG BAY, 1*st November*, 1812.

'(Signed) A. F. JONES.'

Appended to the report by Captain Jones is the following note entitled:—

'*Expenses attending the cultivation of 60 morgen of good arable irrigable land at one day's journey from Cape Town, sown with wheat the first year*:—

FOR CLEANING—	
Twenty labourers during 2 months, ...	$1000
FOR TURNING UP—	
Four ploughs, complete with ploughmen, oxen, and cattle, for 18 days, ...	720
FOR PLOUGHING AND SOWING—	
Four ploughs and cattle, 24 days, ...	960
Thirty muids of seed, ...	300
FOR HARROWING—	
One harrow and cattle for 24 days, ...	192
FOR REAPING AND SHEARING—	
Ten labourers during 30 days, ...	900
FOR BRINGING IN AND STACKING—	
Four waggons during 4 days, ...	160
Three labourers, ...	12
FOR THRASHING.—	
Twenty horses for 24 days, ...	240
Four labourers, ...	96
FOR CARRYING TO MARKET THE PRODUCE, WHICH OUGHT TO BE TWENTY FOR ONE—	
Thus—600 muids at 2 dollars per muid, ...	1200
Do. straw and chaff, 20 loads, ...	400
Return, ...	$6180
600 muids at 10 dollars per muid, ... $6000	
Chaff and straw, ... 800	
	$6800
Profit, ...	$620

'The next year the expense for cleaning will be saved, but then only the half of the land can be sown. The whole, however, must be turned up, and manure must be carried to that part which is to be sown, which for 30 morgen is at least one hundred and fifty loads.'

A like estimate of what this will be is given. These estimates relate immediately to expense of exploitation for the Navy, but from the insertion of them in his report I infer that attention may have been given by Captain Jones to the consideration of means of meeting the expense of exploiting the forests and of obtaining revenue from them by agriculture, or by disposing of void spaces for agricultural operations—if not also to the consideration of the expediency of clearing forest lands, using the products, and devoting the cleared land, by sale or otherwise, to such culture.

The report is cited as the earliest authoritative document in regard to forests of the Colony which I have been able to procure.

The report of Captain Jones treats mainly of the adaptation, or the reverse, of the various kinds of wood for being employed in shipbuilding, which was what his commission required of him to do. No information is given in regard to any arrangements which may have been in operation at that time in connection with the conservation and exploitation of the forests; nor have I found any indication beyond what is supplied by the appointment of Baron von Collet D'Escury, already referred to, that any great degree of attention was then given to such matters; but it may have been otherwise.

The report made by Captain Jones may give to those who are unacquainted with the district some idea of the difficulties with which wood-cutters, whether prosecuting their work on a great or on a limited scale had then, and, as I have seen, had still later to struggle. I do not suppose any one acquainted with the forests of the district will accuse him of exaggerating these. So late as 1861—half-a-century after this report was made by Captain Jones—it was stated in regard to the Kaayman's Gat, in evidence given before a Select Committee of the Legislative Assembly, on the George and Knysna roads, by Captain Allen, who, as was stated in his evidence, had resided previously in the neighbourhood of George, and had ridden

very frequently over the district at a time when he had a contract for supplying the cattle for beef for convicts employed in making Montague Pass, a work of many years, in reply to Q. 69. Would you describe the road to Kaayman's Gat? 'It is quite as difficult as any portion of the old Cradock Pass, but the length is not so much. I suppose the length of the very steep part must be about a quarter of a mile. I have seen fourteen or sixteen oxen sticking there with little more than half a load of wood (a loop and a half.) The bush carriers know the nature of an ox so well that when one sticks they will never take him out of the yoke, but leave them till they pull out, or they will always be doing so, and there they will stick for hours till at last they pull out. The driver often goes away and takes a rest in the meantime. Of a moon-light night from my house, I have many a time heard their whips going, and I often pitied the poor oxen.'

The old Cradock Pass spoken of, now superseded by the magnificent mountain pass then under construction, was one of which few of the Colonists of the present day have seen the like. I travelled by it some forty years ago or more, driving my riding horse before me, while it, and I, and others of our party, choose each his own way, leaping shelves of rock at least two feet deep—a frightful pass. There exist in the Colony plates of it as it was when it was the only pass available for traffic—oxen struggling, and long gangs of drivers clambering on the mountain side, holding ropes attached to the axles of the wheels of the waggons to prevent them from sliding off the precipitous slanting road into the abyss on the off side, in which there was no barrier or footing for any. To this I shall afterwards refer at greater length.

The following is a continuation of the evidence given by Captain Allen:—

'70. The Kaayman's River Height,—What is the height of it?—About six hundred and fifty feet above the level of the sea. There is one portion of the road there quite as bad as the Cradock Pass or any other I ever saw. I think that is the steepest part of the whole way, say for one hundred and fifty yards at the first turning.

'71. Travellers on horseback are obliged to dismount?—Yes, you cannot ride safely, and the waggon has to be held up. Any one standing at the bottom there would say it is wonderful how the devil they ever get over.

'72. The wear and tear of waggons is very great there?—Yes, I have known waggons pitch right over, and disselbooms and wheels are constantly breaking. The wood-cutters generally manage better than others. I recollect one farmer going over with his brandy and all.

'73. Then after getting over that place the road is pretty good?—No; there are three or four places, but not so bad by a great way.

'74. *Mr Prince*—At Trek-aan-de-touw it is very bad?—Yes. Two waggons cannot pass each other there. They are obliged to crack their whips at one side to prevent the others from coming on.

'75. *Chairman*—What is the width of road on the other side of the Trek-aan-de-touw river?—By constant rieming of the wheels it is cut down to a narrow passage, not above eight feet wide, so that there is not room for two waggons to pass each other.

'76. And how far does that continue?—I should say from the river to the flat land, after you get out of the steep ascent, it is a good six hundred yards; or not quite half a mile.

'77. Then after passing the height the road is pretty good until you get to the second Swarte River. Would you have the goodness to give the committee an explanation of the state of the road there?—That is a very bad place. The ascent is about five hundred feet.

'78. *Dr White*—Do you consider it as bad as Kaayman's Gat?—There is sand which makes it heavy but it is not quite so steep. If you consider, an ascent of five hundred feet in the distance of three quarters of a mile, it is almost one foot in seven.

'79. *Mr Prince*—Are you aware that over this sandy hill the waggons are only able to bring up a part of a load at a time?—That is the case over every ravine and over every kloof. I

cannot speak as to that particular sandy hill, but I recollect myself only bringing up half a load.

'80. *Chairman*—Then the Swarte River, how is that?—The Swarte River is very deep, and when waggons go through the oxen are often swimming. In coming through on horseback you have to sit on the top of the saddle, and often swim altogether.

'81. Are you aware of another such road in any part of the country?—No; there is not such another I am sure. Then again in coming round to the Dankama it is very heavy, for the waggons constantly coming through the same place makes the ruts very deep.

'82. Are you aware that the traffic has greatly diminished on that road?—Yes.

'83. To what cause do you attribute that?—It must be the cattle sickness, because most of the farmers have lost great numbers. One man once showed me four hundred fine young cattle, and he lost the whole in two months.'

And the testimony of Captain Allen is sustained by evidence given by others before the same Committee.

In 1863 I rode over the district in company with the Hon. Mr Davidson, then Civil Commissioner of the district, subsequently Treasurer General of the Colony, and I found the road in keeping with the descriptions given. But I am given to understand that since then the communication between the Knysna and George and Mossel Bay is greatly improved, and may be safely traversed with carts and horses, and thus may wood be transported not only to the port of the Knysna, and to that of Mossel Bay, but to the railway station most accessible from the point at which it is brought out from the forests and thence distributed over the interior of the Colony, far and near, wherever it may be required. Captain Jones refers to the difficulty of communicating with the Lange Kloof, and so with districts in the Colony beyond, referring not only to the Montague Pass, and to Colonial roads outside the forests, but to the roads through the forests. This also has been changed. A new road was being made when I visited the forests of the

Knysna and of George, and I made my exit from these riding at a snail's pace for miles along a cutting on the face of the mountain, the line to be followed by the road in the first stage of its creation; so narrow was it, and the mountain so precipitous, that here the leg or the saddlebag grazed the rock, and there the other leg or saddlebag overhung a wall-like descent, with tree tops level with the path. I had often to hold my breath; but I dared not show signs of fear for I knew that some fortnight before Mrs Grey, the wife of Bishop Grey, had, with her husband, ridden along the same rough and perilous path without shrinking or showing signs of fear.

Some time after I had left the Colony, at the end of 1861, I received a Port Elizabeth newspaper, in which it is reported:—

'The new road from the Knysna to Lange Kloof is better than most roads in the Colony. At present there is a good road from Keurbooms River, in the Lange Kloof, to the Knysna. In about eighteen months this road will be completed in a direct line from the Vlugt through a wild mountain pass of eleven miles in length, and entering the Lange Kloof at Zondagh's farm. This will make the distance to the Knysna fifty miles only, and fifty-five from the rising village of Lyon. There are about 400 convicts employed on the road, and their work is marvellously good, leading one to believe, as he looks at the well-built retaining walls, some of which are fifty feet high, that it is the work of skilled masons instead of Kaffir and Hottentot prisoners. This work is being constructed under the supervision of Mr Bain (son of the late A. G. Bain), and when completed will cost about £80,000. The scenery through this pass, and the forest near the Knysna, is peculiarly grand and beautiful, and will well repay pleasure seekers by a visit; indeed one cannot know what the Cape really is until a visit to this district has been made. The road passes through some fifteen miles of forest, the trees of which rise to the height of ninety to one hundred feet overhead, and are so close together that, with the underwood, it may almost be called impenetrable. Elephants and buffaloes are numerous, but they cannot be hunted without a special license.'

The importance at that time of having good roads for the transport of timber will become manifest if there be born in mind the difficulty of shipping it for transport by sea, and the difficulty of crossing by the pass—the Cradock Mountains.

Mossel Bay, where shipment of timber might be effected with some measure of ease, is upwards of forty miles distant from the forests. And of the rivers flowing into the sea from the forests on the coast, we have found Captain Jones reporting that none of them afford any facility for the purpose, and a description is given of the perils of the Knysna and adjacent coast.

The Knysna forest extends to the immediate vicinity of a noble sheet of water, beautiful in itself, and beautiful in its surroundings, formed by a great expansion of the river before it enters the ocean by the narrow strait created by two projecting promontories of considerable height, reminding one of the name the Gates of Hercules, and the Gates of the Oomzimvooboo in the Trans Kei territory. The risks connected with the shooting of this by shipping entering or leaving the port was then considerable when the wind blew in certain directions; and this continued to be the case beyond the first half of the present century. But these risks, never formidable to skilful mariners, have now, by steam navigation, been reduced to a minimum.

In the notice of this region in 1861, which I have cited from a Port Elizabeth newspaper, it is stated:—

'The Algoa Bay port-captain, Lieutenant Skead, has just returned from a visit to Plettenberg Bay and the Knysna. He speaks in glowing terms of the capabilities of the Knysna as a port. H.M.'s steamer Rapid crossed the bar and entered the river, and when there Captain Jago erected a large iron-wood beacon in lieu of the smaller one placed there some years ago by Lieutenant Skead. The new beacon is a square iron-wood block, sunk in the ground six feet, and standing above it forty-two feet. At the top are two large triangular discs, each eight feet perpendicular height, placed one above the other, and painted red. The whole can be seen a long way off, and answers well the purpose for which it was intended. The new

landing stage or jetty is completed, and when Lieutenant Skead was there two schooners were lying alongside it and loading with timber, and a third waiting her turn to haul alongside.'

Thus had some of the difficulties in the way of utilisation of these forests, reported by Captain Jones, been then removed.

The following graphic account given by a traveller in these parts, indicated only by the initial Captain W—, of his impressions of the mouth of the Knysna and the Lagoon, of the coast, and of inland scenery, is embodied by Charles John Anderssen in his volume entitled *The Okavango River: a Narrative of Travel, Exploration, and Adventure.* It is introduced by him as a contrast to the narrative he himself had given of inland wastes and deserts. Gladly would I transcribe the whole, but I must content myself with what more immediately pertains to my theme.

'Proceeding,' says our traveller, 'from Port Elizabeth, Algoa Bay, to Capetown, we had occasion to touch at the Knysna. After beating on and off for nearly a week to discover the entrance, we at length perceived the pilot's signal, which was anything but favourable to our enterprise. We had been previously informed that it was customary to hoist a red flag upon the pilot's tower, which is erected on the east cliff at this notable entrance, at periods of danger; and lo! the discouraging signal. Notwithstanding this serious obstacle to our wishes, we had the temerity to risk all hazards, and to steer direct to port. Our captain was doubtless an excellent seaman, and we fully confided in his skill; he pleaded the hour of the day and a fair wind, which was most essential, in order to justify his neglect of the pilot's signal. We neared, therefore, the coast, and it became evident that the entrance was rather narrow, in truth, a mere rent in the cliff, effected by some sudden convulsion and subsidence of the intermediate rock; but of this I could obtain no information, as there is no existent record of this catastrophe. Our attention was arrested

by a glimpse of the picturesque interior; and nothing daunted from the confidence which we derived from the calm bearing of the crew, I devoted myself to making a drawing of the entrance of the Knysna, with the mountain scenery in the back-ground. It was impossible to look around without feelings of awe and admiration; the whole line of coast, eastward and westward, was literally fringed with huge broken masses of rock, over which was breaking a tremendous spray. We could descry a species of "Scylla and Charybdis" on either side, whirling and bellowing with convulsive shocks; now emerging from the foam, and presenting a bare, black, broken surface, which fancy might depict a many-headed hydra form; then drinking up the coming sea, it would vomit forth the frothy spume into a thousand fantastical cascades, shedding the prismatic colours of the iris. "If the wind slackened now," said the captain, "we should fall an easy prey to one or other of these monsters." A heavy swell of the sea appeared now to raise us perpendicular, and suddenly precipitated us forward with fearful velocity to the critical point of the navigation.

Everything previously had appeared to harmonise with our wishes. "Steady" was the word, and "Port" oft repeated. At length the captain took the helm; all the hands were in a bustle, and looked anxious. "Now, my lads, hold on," was loudly vociferated; the vessel trembled under our feet. I looked anxiously abaft; a sudden shock threw most of us along the deck, when I beheld with terror an appalling sea spreading the whole length of this celebrated entrance, fully half-a-mile, now lifting up its head close to our stern, and mantling with rage that we had escaped, and beginning to curl upon its mighty volume as if it would engulf our vessel. A momentary thrill of horror seemed to paralyse all on board; we felt the final shock of its rage in safety; it fell powerless in our rear, and with one deep long sweep, at least a quarter of a mile, which seemed to reach the very bottom, propelled us securely over the bar. "All's well! Steady, my lads! Port! Port!" was heartily said, as we dashed into the rapids of conflicting currents, occasioned by the tide now settling

outward with race-horse speed through the contracted passage. Being fairly entered, we perceived the pilot anxiously awaiting us; and, motioning with his flag, endeavouring to direct us through the intricacies of this mazy and eddying gorge. This we effected with admirable precision, and swiftly passing on to a considerable distance, we at once glided into a smooth tranquil mirror-like basin, aptly and comprehensively termed "The sailors' feather-bed bay." In our precipitate passage every object seemed magically to run past us as we almost brushed the branches of the flowing foliage of this delightful fairy region.'

The pilot speedily boarded the vessel, and there followed angry remonstrances with the captain on the risk to the vessel, the cargo, the passengers, and the crew, incurred by the temerity of the preceding, with details of loss of life on other occasions which had followed such conduct. The narrator goes on to say—'We were informed that a short time after the pilot had been appointed to this station three or four persons connected with the naval establishment determined to try their powers in stemming the current outside the bar when the tide was setting out with all its velocity. They had been cautioned not to hazard their lives in such a useless and foolhardy experiment; but, strong in their own opinion, advice was fruitless. They manned their boat, and proceeded to the current, which speedily put the metal of these brave fellows to the test, who, when it was too late, discovered that they had been over presumptuous. All human effort proved unavailing and ineffectual against the potent stream; the conflicting currents baffled their endeavours; and fear and remorse overwhelmed them in the vortex of destruction. Their distress was but too evident; their uplifted hands spoke their hearts grief and despair; they were beyond the reach of human aid, and their agonised screams were mocked in the turmoil and unceasing din of the roaring billows. The boat was soon carried aloft amidst the breakers; it soon after appeared at a considerable distance from the land, like a speck upon the ocean, and, melancholy to relate, these courageous and once

useful members of society were, in the prime of life, hurried away by their precipitate bravado into a lingering and horrible death—carried out to sea, without the smallest provision, and never heard of more.

'But notwithstanding all that has been said of the narrow entrance, the iron-bound coast, the rocky obstructions, and the mighty surge which beset this river, there is no doubt that by duly attending to the instructions and signals of the pilot, the navigation of the Knysna may be as readily and safely effected as that of any other barred river.

'A delightful tranquility succeeded the excited feelings which such perilous encounters as we had passed through seldom fail to produce. We had now a noble and diversified prospect before us, and therefore an ample field for inquiry and contemplation. Like to the still waters of the Northumberland lakes, the distant hills and surrounding woods gave deep interest to this novel scene; every object before us was faithfully reflected in the placid bosom of the liquid mirror, and we continued to glide along its smooth surface for about a mile and a-half, when the rattling cable gave notice that we were soon to be transferred to *terra firma*, a change to which we looked forward with considerable impatience; and which we found, as soon as we pitched our tents on shore, really delightful. . . . . .

'We will now take a peep outside. The delicious climate invites us to enjoy every moment that remains of daylight, and we have a magnificent panorama to inspect. Yonder to the south stand two pyramidal rocks of granite, faithful sentinels to the mouth of the Knysna. The westward heights are fringed with splendid foliage descending to the margin of the stream. Eastward the pilot's tower betokens the care which the Admiralty takes in giving security and confidence to those who live on the mighty deep. Its site is well chosen upon a lofty promontory, and it may be seen at twelve miles distance. How highly picturesque are the sides of its elevation covered with every variety of evergreen shrubs spangled with blossoms of every hue, and fragrant as beautiful. Huge masses of rocks

intersperse the shrubbery, and these are of various romantic shapes—some with well-formed arches, oriental, gothic, and Roman; others deeply caverned, reiterating with thundering yells the stunning sound of never-ceasing breakers, appear the abode of the furies, and foaming with ire, forbid approach or investigation.

'The pilot's house at the foot of the eastern heights, to which access is given by a zigzag foot-path, next commands attention. Its position is pretty well sheltered, having a "stoop" before it, *i.e.* a raised terrace wall, that affords a pleasant lounge for the enjoyment of a cigar. Adjoining is a boathouse and sheds, well supplied with grappling irons, cordage, spars, and fishing tackle. But what is that great bulk which encumbers the view in front of the dwelling? Alas! the remains of the first vessel that dared encounter the navigation—the Emu. The Emu rocks were pointed out to us as we entered, jutting into the channel nearly under the pilot's tower. To avoid these wreckers, large posts are fixed upon the heights above, which mark the proper bearing to escape all danger; so that what was once truly difficult and hazardous is now rendered easily accessible and perfectly free from danger. The salt marshes which form the great basin are altogether very extensive, and cover many thousand acres. They are occasionally flooded, and then we have a noble expanse of inland water, as fine as any of the most celebrated lakes of Europe for picturesque beauty, though not perhaps of so great extent. On the west bank of the river we perceived a farm under Dutch cultivation, the possession of Mynheer Barret, whose flocks and herds browse as far as the western cliffs. On the opposite side beyond the marshes is Milk Kraal Farm, with the modest but comfortable residence of George Rex, Esq., an English gentleman; and on the north of our marquee is the Government dockyard, with sheds, mould lofts, and other buildings, and the residence of the master builder.

'Beyond these several objects rose an undulating background studded with forest trees, natural plots of flowering shrubs, an infinite variety of evergreens, rare plants, and

singular looking grasses, large plots of wild geraniums, and heaths of a thousand species winding round the extensive basins, and traversing the banks of the rivers far away even to the distance of the Uitenbegtta range of mountains, and possessing numerous localities of great beauty and interest, which a transitory visit to Knysna could not afford an opportunity to inspect, much less to describe with justice. Suffice it therefore to say that this is the most park-like and beautiful district which I have visited in South Africa.

'We had lovely weather, and the soft refreshing air whispered the near closing of a day never to be forgotten. The long distant shadows of the hills now approached us, and spread their grey mantle over the valley; white fleecy vapours flitted across the bosoms of the distant hills, and almost sudden night involved us in darkness. Pending our brief daylight we had the good fortune to get our stores and boxes on shore, while abundance of provisions poured in upon us from all quarters. We here found everything we could wish—wood, water, stock of various kinds—so wonderfully do supplies generally exceed the demand. We had blazing fires between the river and our marquee, and they were soon put in requisition by all our followers.

'The glaring ruddy light, and the busy spectacle of numerous persons quickly passing to and fro, was a singular contrast to the calm scene we had so recently witnessed. This again soon gave place to silence: all hands had revelled and dispersed. The stars twinkled in their spheres; the crickets and the hosts of the marshes sent forth their sonorous and incessant din to lull us into sleep; but, soft! We hear sounds which murder sleep, and restlessness appears in every animal around us. My horse and my goat had been made fast near the entrance of my marquee, and their anxiety and instinctive watchfulness was but too apparent. I cautiously looked out, and numerous eyes glissened on every side, while streams of phosphoric sparks swept over our roof, and almost brushed my face. These I had happily seen before. The little firefly was a familiar visitant, and harmless; but how, thought I, shall I secure my horse and goat? as if they

should be attacked there was danger in an attempt to save them. We could form no resolution, and therefore as usual after the precaution of increasing the number of the lights and making as many shadows as possible, we resigned ourselves to the guardianship of the All-Merciful for the night. Our rest was frequently disturbed with woo-woo-woo, as the thousand wolves grew often bolder; and my horse plunged so dreadfully at times that we feared our walls would give way. Daylight, however, and the "Yeo heave ho" of the sailors, sent these voracious neighbours bootless home to their fastnesses. The morning ushered in a host of visitors to our marquee of every grade, chiefly Dutchmen, in the hope of purchasing stores. Fire-arms, gunpowder, tea, groceries, and hardware, were chiefly in request; but of these I had previously disposed of all that I could spare, which caused great disappointment. All these visitors were remarkably frank and familiar, freely partook of our fare, and politely praised everything they beheld. Those Boers, improperly so called, were remarkably *courteous;* inviting us to their houses, and offering to send waggons for us. With these Meinheers it was all "moey," "plenty," and "pretty," &c. After satisfying their curiosity they civilly withdrew; apparently well pleased with their reception, for they repeated their visit every morning during our stay.'

Shortly after their last visitor had left them, they had the satisfaction of seeing another vessel—the Durban—enter the lake, with a press of sail, in capital style. She had the tide in her favour, and the pilot had boarded her outside the bar, giving a fine illustration of the safe and easy navigation of the entrance in favourable weather.

The traveller and his friends were treated with characteristic hospitality by Mr Rex, of Milk Farm, and his family, and this was greatly enjoyed. But he writes:—'As our sojourn in this blissful vale must necessarily be short, we had determined to make good use of our time, and I had arranged my plan, which I carried the next morning into execution, for a trip through the forests to Plettenberg Bay.

'The country which on this expedition we passed through was everywhere delightful as far as the eye could reach; and the deep green woods, with their fine umbrageous foliage, gave us a grateful shelter from the heat of the sun as the day advanced and began to be oppressive. Nothing could be more striking than the stateliness of the trees, most of which were flowering evergreens, presenting to our view a great variety of beautiful pendant bunches of flowers of all colours, yielding at the same time a most delicate fragrance, while at the same time the ground beneath was studded and enamelled with a multiplicity of curious wax-like little stars, daisies, and harebells. The road was well defined, and nearly straight, for a considerable distance, having very much the appearance of an old path. It was an isolated spot a few years ago, when the Kaffirs committed fearful ravages and murders. After passing through the forest we soon obtained a fine view of Plettenberg Bay, which, being distant from Knysna about fifteen miles, we reached in two hours and a-half. Here we observed the extensive ruins of a considerable range of warehouses, the original depôt of the Dutch East India Company. Having made the circuit of the Bay, which is a fine roadstead for shipping, we retraced our way home, which we reached soon after sunset, being highly satisfied with our excursion.

'We felt it our duty to acknowledge the generous presents of George Rex, Esq., the gentleman who had deputed his son to visit us, by paying him a visit in return. He is an English farmer upon a large scale; his vineyard, tobacco plot, and fields of wheat and pulse, all bore testimony to a neat and clean system of agriculture; in fact the whole establishment gave evident token that everything was under the direction and guidance of an active and cultivated mind, while his numerous family spoke of a state of filial and fraternal affection, excellent social discipline, and refinement of manners, rarely to be met with in places so far removed from the thoroughfares or even bye-ways of civilisation. We had passed several very pleasant days in making short excurisons in the neighbourhood, when the skipper announced that he had completed his cargo, and

that his intention was to put to sea the following morning. We therefore soon dispatched matters for striking our marquee and our tents, which, with our luggage, were soon on board. We embarked before sunset on Christmas eve, taking a last farewell of the scene which has left an indelible impression on our hearts and minds.

'The river, which forms its chief feature, of great beauty though not of great extent, is calculated to be of vast importance to future generations in a commercial point of view; it abounds with a great variety of delicious fish, particularly the mullet; here too the paper nautillus has a safe retreat, yielding specimens of the largest and most beautiful kinds anywhere to be met with; nor can I forget the feathered tribe which imparts additional interest to the groves. Without pretending to describe the different species I will merely intimate that I have seen examples of most rare and curious forms and habits, and others of most gorgeous plumage, but no vocalists. In this respect the woods are mute, except from the singular and delorous bird which distinctly and continually breaks the dall monotony with its loud cry of *Fifty dollars*, and is hence called the Fifty dollar bird. With respect to the wild animals and multitudes of pernicious reptiles, these are known to swarm in South Africa.'

As travellers who have but little command of the pencil sometimes avail themselves of the sketches of the artist to illustrate their works, and convey more correctly ideas which they can but imperfectly convey by words, and this even when the sketch includes more than they had designed to describe, so do I gladly avail myself of the pen of this traveller, more graphic than my own, to convey an idea of this lovely spot. I too visited the place, and like him, was charmed with its surroundings. All his details are in accordance with the impressions I received. There are there flowers of the field blooming luxuriantly, and flowering shrubs. What he describes as lofty flowering trees may have been other than were seen by me. Something similar I saw, but what were seen by me were

towering trees giving support to a climbing pelargonium, which having ascended the trunk, spread amongst the branches of the crown, and gave glory to this by intermixing its gorgeous flowers with the foliage there. I had seen many arborescent compositae and many arborescent papilionaceous shrubs and trees, the *Virgilia Capensis*, and the Cape laburnum, and *Crotalaria Capensis*, the *Schotia Latifolia*, and the magnificent *Erythrina Caffra;* but these seemed far surpassed by those; and it was with something like disappointment that I found they were adorned with flowers which were not their own, the flowers of plants which thus rewarded support given to their weak herbaceous stems. In other cases I found both trees and bushes adorned with the flowers of other plants: bushes decked out with garlands of the beautiful *Microloma*, with its beautiful waxen flowers like those of the *Hoya carnosa;* and bushes and arborescent shrubs, bearing flowers of the *Loranthus* beautifying stunted acacias with large clusters of rich crimson flowers and bright yellow-green leaves refreshing and delighting the traveller in the parched desert. Mention is made of songless birds. I found it a common saying in the Colony that there the birds have no song, the flowers no fragrance, the rivers no water, and the women no beauty. The last must have been designed to be understood as ironical, or as playful mischief, for even the women of the native tribes have a beauty all their own; and of none of the other subjects of tirade does what is said hold to be absolutely true.

It was from Mr Rex, of Milk Farm, that through a friend I re-obtained the copy of the report made by Captain Jones, of the forest region stretching from the Knysna to Plettenberg Bay and beyond.

Of like character with the account given by Captain Jones of the coast and rivers from the forests flowing into the sea, is the account given by him of the difficulties of crossing the Kaayman's River and the Cradock Mountains. I have stated that this pass I have traversed. The new pass which had been constructed is one along which a light vehicle may bowl with perfect ease and safety; but in the spirit of

adventure I preferred, along with a fellow-traveller, to essay the old pass We were making the journey on horseback, with a minimum of luggage. We managed to ride to the summit of the pass; but there we found that the real difficulty for us was the descent. To attempt to continue the journey at this stage on horseback would have been foolhardy in the extreme; we dismounted, fastened our stirrup irons, and attached the bridle loosely to a light valise in front of the saddle, and let the horses find their way as best they could, while we followed them. There were stair-like ridges to descend—12, 18, and in some cases 24 or 30 inches or more in depth, at least so it seems to me in recalling to memory the adventures of the day; and our experiences were in accordance with the recorded experiences of others before the opening of the new pass, and with the plates already referred to, plates prepared by the engineer, of what was seen of the struggles of waggoners to prevent the upsetting of waggons into the deep valley, and to surmount the difficulties of the ascent.

Mr James Backhouse, of York, a member of the Society of Friends, writing of his crossing the range by this pass in 1838, tells under date corresponding to 21st December, 'We commenced the ascent of the mountains early in the morning at Cradock Kloof, and reached the further side in about four hours, inclusive of a short rest at the top, and several temporary detentions by sticking against masses of rock that projected into the pass. In several places there was scarcely room for a man to stand between the edge of the precipice and the waggon, which was prevented from being precipitated into the vale below by holding it upon the road by means of "riems" [strong strips of untanned hide] fixed to the hinder part. The danger of this pass, which has a sharp turn on the point of a precipice, is such as to excite corresponding care, and consequently accidents of a serious character seldom occur in traversing it. The shaking and jumping of the waggon as it was dragged along, especially as it descended the mountain, were such as a person who has not seen it would scarcely believe

any carriage could endure. The drag-shoe is not used on these occasions lest the wheel should start out of it; but both the hind wheels are chained, and the waggon is stopped at short intervals to shift the chains alternately in order to prevent the wheel tire from heating to an injurious degree, or from wearing too much at one place, as well as to prevent the waggon from gaining too much impetus.'

Mr Andrew Steedman, in his volumes entitled *Wanderings and Adventures in the Interior of Southern Africa*, gives the following account of his experience in crossing in February, 1831:—

'A dense and heavy mist hung over the Cradock Mountain on our approach, and as the rain soon began to fall in heavy showers, our situation became extremely unpleasant; the more so as the spot selected for our bivouac at the foot of the mountain was particularly exposed to the storm, which continued during the whole night. The next day being Sunday, we observed it as a day of rest. During the afternoon two waggons laden with grain began to ascend the pass. As they passed our tent I inquired of the farmers to whom they belonged, if they intended to venture over the mountain, observing that the road was exceedingly bad, and the ascent extremely difficult for the oxen in consequence of the violent rains that had recently fallen. They replied "Yah, Mynheer! Ike shaal prebere," [I shall try it.] Some hours afterwards, however, I heard them cracking their ponderous whips, the sharp sounds of which were re-echoed by the mountains. I could discern at a distance that the waggons remained stationary, and notwithstanding all their efforts the oxen were utterly unable to drag them forward, nor was it until an advanced hour on the following morning that these pertinacious Boers succeeded, by the assistance of another span of oxen, in extricating their waggons from this difficult situation.

'About this time we commenced the ascent, and accomplished it shortly after the farmers, whom we found reposing on the summit, their oxen having been completely exhausted by their morning's exertion. They declared that they would never go

over that pass again, protesting that it was only fit for baboons to climb up. We learned from them that another waggon which passed them on the mountain, having commenced its descent without observing theirs, had narrowly escaped being precipitated over the precipice, in consequence of the road being so extremely narrow where the two waggons met.

'The view from the top of this eminence was altogether as grand as the descent before us was terrific. The wheels of our waggon were locked, and four of the front oxen taken out, in order to render the others more manageable. Notwithstanding this precaution the ponderous vehicle, when once in motion, rushed down the steep and almost perpendicular slope with fearful rapidity. I fully made up my mind that we should not reach the foot of the mountain in safety. In spite of my apprehensions, however, we accomplished this perilous descent. After four hours of incessant struggle with the oxen, the Hottentots succeeded in overcoming every difficulty, without our waggon sustaining any material damage.'

To do justice to those who had the administration and management of the Crown forests of the Colony under the old regime, it is necessary that we should understand in some measure the condition of the Colony in respect of ways and communications, and under this impression I have adduced these narratives. With steamboats and railways the conditions are altogether different.

It is pleasant, however, to look back upon these former conditions and to see the forests as they appeared to those who saw them in those days. Mr Steedman continues his narrative :—

'We *outspanned* for the night at a spot formerly the residence and property of the late Captain Harding, but now belonging to the Veld-Cornet Reinsberg, from whence we had a delightful view of the village of George, with the ocean in the distance.

'There is here an immense forest, which extends towards the Kaayman's River, where Le Vaillant formed his encampment, and added so considerably to his collection of natural

history. George Town, which we passed through on the succeeding day, is pleasantly situated on an extensive plain at the base of the Cradock Mountains, seven miles from the sea-coast. It contains a population of about 700 inhabitants, including people of colour. There are eighty houses with gardens adjoining, a church, and two public schools. The environs afford good pasturage for cattle throughout the year, the soil being constantly moist from its vicinity to the coast, and the heat of summer generally mitigated by a gentle sea breeze. The Government forests commence about a mile from the town, extending along a vast chain of mountains to the Zitzikamma. The principal support of the inhabitants is derived from felling timber in these forests, which they convey in waggons to the adjacent villages, and frequently to Cape Town.'

He too had visited the Knysna in his journey thither. He writes:—

'Towards night we reached the abode of farmer Reinsberg, Veld-Cornet of this district, having passed six days in travelling through the valley of Lange Kloof.

'Quitting the waggon here, I proceeded on horseback to the Knysna, a long day's journey from the farm, over one of the most frightful passes in the Colony, called the Devil's Kop, from the summit of which, as far as the eye could reach, was a "sea of mountains, wild, boundless, desolate."

'Reaching the hospitable mansion of Mr Rex, I remained there two days, during which I visited the enchanting scenery for which the Knysna is so justly celebrated. This part of the district of George is said to be the most beautiful in the Colony. Mr Rex, having recently purchased the land on the opposite side of the river, now possessed nearly the whole extent of the Knysna, comprising upwards of 24,000 acres. The river takes its rise from the mountains, and empties itself into the sea through an opening 840 feet broad, between two perpendicular cliffs. I was informed by Mr Rex that up to that time 104 vessels had visited the port, and that there had

hitherto been only four wrecks The Conch, a schooner of eighty or ninety tons, had lately been coppered there, and had just sailed. A vessel, which Mr Rex had recently built of timber from his own estate, and called the Knysna, had been driven from her moorings during the late heavy rains, and was now lying high and dry upon the shore; but the bank being of soft mud she had sustained no injury. All the people who could be collected in the neighbourhood were busily engaged in cutting a channel to get her afloat the next spring-tide. The stream had risen on that occasion upwards of nine feet above high-water mark; and its reflux was described to have been most tremendous, as in its passage it carried away immense trees, and beams of timber, which had been cut down and were lying on its banks, threatening destruction to whatever impeded its course. I was told by Captain Watt, who superintended the building of the vessel, that on the Monday preceding the rain the thermometer had stood at 106 degrees, and when the hot winds blew had risen to 110 in the shade. Myriads of small insects, generated by the heat, filled the air, causing an intolerable degree of annoyance.

'The pasturage about the Knysna is remarkably good during the summer months; and as the dews are very heavy, in consequence of its vicinity to the sea, the grass never loses its verdure, even in seasons of the greatest drought. The inhabitants of this district principally support themselves by felling timber in the Government forests, which they bring to the Knysna for sale, where Mr Rex, and a few others engaged in the wood trade reside, and from thence it is transported by small vessels to Capetown. Plettenberg Bay, which lies a few miles to the eastward of the Knysna, is an open roadstead, but so much exposed to the south-east wind that danger frequently attends any attempt to effect a landing. The country abounds with game, from the elephant and buffalo which inhabit the forest, to the pigmy antelope, the smallest and most elegant of all its species. Birds of splendid plumage, from the tall and stately flamingo to the delicate little egretta, together with various aquatic birds, line the river's banks.

The woods are inhabited by the most beautiful specimens of the feathered race that the Colony can boast. In his garden Mr Rex had a choice collection of plants, amongst which he pointed out some rare botanical specimens.

'I left the hospitable mansion of Mr Rex, from whom I had received that kindness and attention which is so universally experienced by all who visit him; and on my return to farmer Reinsberg's, proceeded by a footpath through a thick forest leading to the river, named by the Hottentots the Oompney. This, as it was much swollen by the rains, I found some difficulty in fording, my horse being more than once out of his depth, to my no small discomfiture. I had then to penetrate another thick forest beyond the opposite bank, which, being overgrown with brushwood, rendered the ascent very fatiguing. Here I occasionally caught sight of the little blauwbook, or pigmy antelope, which inhabits the woods, and lives among the thick bushes. Nothing can surpass the grace and agility with which these elegant little animals bound along through the shady avenues of the primæval forests of South Africa—now skipping over some opposing shrub—now darting beneath the rank vegetation, butting at each other with their tiny horns, and playing a thousand innocent and amusing gambols.'

The forests studding this region, including those of the division of George, the Knysna, Plettenberg Bay, the Tzitzikamma, and others in the divisions of Humansdorp and Uitenhage, constitute the most extensive forest district in the Colony. Most of the forests have been greatly devastated by reckless fellings, and by fires; and there are interspersed in the forests luxuriant spots of considerable extent of pasture or meadows, and arable land.

For the International Forestry Exhibition, held in Edinburgh in 1884, there were prepared four charts representative of the rainfall for the year in the different zones of the Colony, the rainfall during the winter, the rainfall during the summer, and the mean number of days of rain registered annually in the different observatories. These were accompanied by a

statement by the Superintendent of Woods and Forests, that according to these charts, based on the mean observations up to the present time, there is a remarkable coincidence between the presence of forests and the annual quantity of rainfall; and that whatever conclusion be drawn from it the fact remains that copious rains and luxuriant forests are inseparable.

Some years after my return to Europe I received a communication from a friend taking a deep interest in the advancement of the prosperity of our several Colonies, stating that a number of young men of education, with a command of capital and of skilled labour, had under consideration the expediency of establishing themselves in a settlement within this forest district for the prosecution there of pastoral and agricultural husbandry, and desiring my opinion in regard to the capabilities of the district, and the probabilities of success of such an enterprise. This I supplied. So far as is known to me nothing came of the project, but in 1880 there appeared in the *Capetown Argus* the following anonymous account of a visit to the district :—

'As the Knysna has been much talked of lately, and a stream of agricultural immigrants is flowing there, I recently took a run down to have a look at a locality so celebrated for its scenery, its forests, and its droves of elephants. I will pass over the voyage in a coasting vessel, except to mention the inconvenience of having to wait, beating about outside the Knysna Heads, which is very trying. The entrance to the Knysna has the appearance of a gateway into the land, guarded on both sides by towering cliffs, covered with rich verdure. On the eastern side is the signal staff, by means of which captains of ships are informed of the state of the bar. After knocking about for some two or three days, I was glad to see the red and white flag run up, which meant that the bar was practicable. It appeared to me that the ships would benefit by the services of a steam tug to tow them in during calms. Time is money and owners of vessels would find such an arrangement a vast saving of time. I have been told of an instance in which a ship was detained outside for no less than ten days.

The scenery, as one enters the Knysna harbour, is truly grand, and lovers of the beauties of nature will find themselves fully repaid for any inconvenience which may have been the result of a rough voyage. Once over the inner bar, you find yourself in a channel of still water. On the left hand the hills are covered with dense bush (the cover of many bucks), while to the right you have a view of the village of Knysna and and the surrounding farms.

'I stayed at the Royal Hotel, where visitors receive every attention from the proprietor, who seems only too glad to afford information to strangers; and who, from his long residence there, is quite competent to do so.

'The steam sawmills of Messrs Bainbridge & Co. are a marvel of industry. Huge logs of stinkwood are being cut into beautiful slabs on one hand, whilst the refuse timber is being converted into table-legs, yokes, chair-legs, and various other things that small pieces of wood are adapted for Many hands are employed, and all seem busy. Another sawmill stands on the marsh near the jetty, but it was closed (for repairs, I was told), and so I had no opportunity of seeing it at work.

'After a stay of some four or five days in the village I started to Plettenberg Bay. The ride from Knysna to that place is very pleasant. We started at 8 A.M., and, after about two hours' riding, got to the Port. This is a narrow neck of forest, through which the road runs. Near thi spot n umbers of bushworkers are located, living in rough huts built of wattles and mud; and, though they suffer from the ills arising from poverty and filth, they appear to be a most happy lot. Beyond the Port is a roadside inn, where it was simply impossible to get any refreshment except biscuit and bad Cape smoke [brandy.] Since the establishment of this inn drunkenness said to have been rife among the Hottentot wood-cutters.

'The road from the Port to Plettenberg Bay is over the flats. These extend for some eight or nine miles in length, and from them is presented a good view of the mountain range of the Lange Kloof. I was much struck with the appearance

of Plettenberg Bay, and although I am no authority on such matters, yet it appeared to me that this Bay was a safer anchorage than Mossel Bay. During my stay there I put up at Mr. Read's boarding-house. The view from here is really fine, commanding the whole of the Bay and beach. Although at present little business is done in this quiet place yet there are signs of its having been a most important post some centuries ago. An old monument still exists, which was erected in 1778 to the memory of Baron Van Plettenberg, then Governor of the Colony. The old Residency, now in ruins, must have been a palatial abode at one time. There are also the remains of large barracks, about 100 yards long, by 20 wide. These indications seem to show that the British Government have utterly neglected what, in the eyes of the old Dutch East India Company, was their first important trading station after Capetown.

'I was much taken with the place and the people. The neighbouring population are all Dutch farmers. A few stores are scattered about. Here, as in other parts of the Colony I have visited, I could not help being struck by the infatuation that the Boers seem to have for ostrich-farming, neglecting everything else to follow it. In the Karoo districts farming operations are of course difficult for want of water; but here a beautiful river, the Keurbooms, runs up a valley for ten miles. On each side of this stream are situated beautiful farms, possessing all the advantages required for agricultural operations, and yet the farmers are obstinately blind to the riches that nature has placed ready for their use.

'After staying a week in Plettenberg Bay I availed myself of an opportunity to return to Knysna in a waggon. The return journey was rather monotonous, owing to the slow progress of the waggon. About 11 o'clock we outspanned near a farm-house on the other side of the Port. As the oxen were to have an hour's rest I strolled over to the house. It is situated about 400 yards from the waggon road, in a hollow, surrounded by bush on all sides, forming a most picturesque locality. Near to the house was a stream of water running

through a ravine. I went to have a look at the water, and here again the same indifference to natural advantages was apparent. At one part there is a splendid fall of water capable of driving the heaviest machinery. The place is called "Witte Els Hoek." About 700 morgen of forest land belongs to the property. As the place is for sale I hope it may fall into the hands of some man who will be able to utilise its natural advantages.

'A stranger coming into the Knysna must be struck by the indifference that landowners seem to have for water power. There are hundreds of farmers in the Karoo districts who would give almost any sum to obtain such a supply of timber and water on their property.

'The journey completed, I was not sorry to find myself once more at the "Royal," enjoying the beautiful view of the Knysna Heads. The next day I left for George Town.'

Not only in forests and valuable arable soil, with facilities for pastoral industry, is this district rich, but here also gold has been found. Some years since a report on this subject, by Mr E. J. Dunn, was issued, of which I find the following notice in a Colonial newspaper of the day:—

'This interesting report is supplied by Mr E. J. Dunn, and gives very full information on the gold fields in the Knysna district. It is accompanied by an excellent map of the portion of country examined, which is of great assistance in enabling one to understand the report thoroughly. Mr Dunn visited and prospected that portion of country lying between Diep River and Homtini River, in order to decide whether the gold exists in payable quantities or not. Operations commenced in the Karatara gold field, near Van der Walt's River, where the most favourable results had hitherto been obtained. At the junction of this river with the Karatara, the most favourable results were met with, the specks of gold being larger, more numerous, and heavier than any met with in the Karatara River itself. Consequently, holes of various depths were sunk at intervals along the creek. The wash-dirt, resting on the

bed-rock, was about one foot in depth; and in it the gold was found. Seven or eight fair-sized specks, not flaky, were washed to the pan of dirt. Mr Bain opened out a claim of 120 feet long, by six or eight feet wide. The top dirt was stripped off, and the wash-dirt, one foot in thickness, run through the sluice-boxes. About 15 dwts. of gold were obtained, a small yield compared with the work done. The gold itself is excellent, being rounded, solid, "shotty" gold; it weighs well, and is very fine; the largest pellets weighed up to seven grains. With the gold is obtained a fine, heavy, grey sand, which, under the microscope, turns out to be extremely well-rounded grains of zircon and topaz. The gold found in Bain's claim is not of local origin, none of the particles are "wooly" or angular; they are well-rounded, and bear evidence of much attrition. This rounded form prevails as high up the creek as gold has been found. The usual prospects are from two to five specks of gold to the pan, the heaviest being about the size of a pin's head. Under these circumstances, ten times the amount found would not pay moderate wages, and no other locality in the district yields even so much. Trials were next made at Pot Hole Gully, Red River, Hooge Kraal River, Lange Bosch Spruit, and other localities, but always with the same result. The gold is not of local origin, and does not occur in paying quantities. At the Homtini River, nothing to warrant much outlay was met with. The result of Mr Dunn's labours is that traces of gold exist over a considerable area; but its rounded worn character points to a non-local origin, and it is much too sparsely distributed to pay for collection. The area examined bears but a small proportion to the extent of similar country unexplored, and about which no opinion can be offered. Yet in what has been observed, there is nothing to encourage further prospecting.'

CHAPTER II.

INITIATIVE RESTRICTIONS UPON RECKLESS WASTE.

FROM what has been stated it appears that in the earlier portion of this century, and in times preceding, so far as is known, little or no supervision over the Crown forests of the Colony was exercised by the Government. And so late as 1820 no revenue was obtained from them in excess of expenses incurred in connection with them.

Some four-and-twenty years later the subject was taken up by Mr Montague, then Colonial Secretary, a gentleman to whom the Colony owes much. Not the least of their obligations are those for what he did in attempting to reclaim by plantations the waste sand of the so-called Flats, stretching from Table Bay to Simon's Bay, and from Table Mountain range to the range of the Hottentot Holland Mountains. And to the condition of the Crown forests of the Colony, and the way in which they were being managed, he gave serious attention.

In 1846, when he was in office, the area of the Crown forests of the Colony appears to have been estimated to be 110,000 morgen Towards the close of that year several forest lots in the district of George were sold by the Government; but there were not found purchasers for all the lots offered for sale, and in little more than six months there was issued another Government notice of which the following is a copy:—

'GOVERNMENT NOTICE, 26TH MAY, 1847.

'Owing to the extensive depredations and serious injuries which have for some time past been permitted in the Crown forests in the district of George, the Right Honourable the Governor has determined to issue no more licenses for felling timber therein; but being desirous not to occasion inconvenience to persons engaged in the timber trade of these forests, the whole of them have been surveyed and subdivided with the view to

their being put up for public sale, at convenient intervals, and in convenient lots. Some of these lands were offered for sale on the 31st October last, of which those hereunder enumerated have not been sold. Notice is hereby given, that these lots can be purchased at the upset price affixed to each, upon application at the office of the Surveyor-General, Capetown, or of the Civil Commissioner, George, &c.'

There follows a list of 25 lots, of the extent of from 300 to 700 morgen each, and their upset prices, from 3s to 15s per acre. Subsequently there was appointed a Commission to consider and report whether it were expedient to continue the practice of disposing of the Crown forests by sale, closing them against felling by wood-cutters and other Colonists who might require wood, but neither have the means nor the will to purchase a forest lot, nor be disposed to pay for wood the prices which might be demanded by private proprietors of forests.'

The Committee made their report in the following terms:—

'The Crown forest lands should not be sold, but licenses to cut timber, waggon wood, and other wood in them, should be granted at a rate not exceeeding £1 per waggon load. Proper and fit forest rangers should be appointed in the different divisions, where there are forests worth preserving, to superintend those forests, to grant licenses to prevent waste and wanton destruction of timber and young wood, to prevent unlicensed cutting, and the squatting and congregating of improper persons at the forests.

'Strong objections have been made to the opening of the Crown forests for licensed timber cutting, generally, almost exclusively, by persons having property in neighbouring forests, who seem desirous to monopolise the supply of timber to the public. Your Committee cannot however see any sufficient grounds for admitting such claims, and not allowing all persons who may require it to obtain wood from the otherwise useless forests on such equitable terms as may meet the wants of the public, and at the same time increase the revenue of the Colony.'

The publication of this report averted the continuous sale of forest lots.

According to the published returns at this time, 158 lots had been surveyed at a cost of £1235 7s 1d, of which there had been sold by the close of 1853, 29 lots for £6532 12s, leaving 129 surveyed lots, with an area of 92,130 morgens, unsold. It is alleged that many intending purchasers were only awaiting the settlement of the question whether felling in unsold or unsurveyed portions was to be reserved, and that several applications for lots were refused. It was expected that a revenue of at least £4000 per annum would be derived from the forests by the sale of licenses at an advanced rate of £1 each. Pending the decision of the question there was considerable excitment amongst those who were interested in the matter. It was alleged, and subsequent facts showed that this had been done correctly, that nothing like such a revenue would be so obtained, while irreparable injuries would be done to the forests by carrying out the scheme.

The mode of computation adopted by some of the most influential advocates for the re-opening of the forests may have been, and probably was, the only one open to them. I say so in knowledge of the difficulty of groping in the dark for data, the want of which is felt. But it was not a mode of computation which would meet or satisfy the requirements of the advanced forest science of the day!

In an important document which I shall have occasion to cite again immediately, it is argued—

'You have it as a fact that thirty years ago at least 2,500 loads were cut annually in the forests of George; but what has been the average since? Taking a very low estimate, 600 individuals earn their living by wood-cutting. Allowing that each could cut and dress one load per month, we have 7,200 loads per year. We may fairly take the half as a very low estimate. Thus by increasing the license to £1 per load would yield a revenue of £3,600 per annum. An increased number of officers would be required, for which we allow an estimate of £600 per annum, leaving a clear revenue of £3000 per annum, (from the forests of George alone), and with a careful supervision, an exhaustless one.'

But the following objections, amongst others, were stated in a petition presented in 1855:—

'1. Because the forest, if in the hands of private individuals, is much more likely to be preserved, and to continue to yield a constant supply of timber to the country, than if open to indiscriminate cutting throughout its entire extent; whilst from the number of persons engaged in the production of wood, no monopoly in that article can possibly arise.

'2. Because the demand for timber, and the capacity of the forest for production in its present almost inaccessible state,* has been greatly over-estimated, and it can be satisfactorily proved that not much more than one-tenth of the annual income of £4000, which the memorialists for the re-opening allege may be derived by the issue of licenses at £1, can ever be produced.

'3. Because it is obvious that a much more numerous and expensive staff will be necessary to superintend the forest properly, when open through its whole extent of 150 miles, and in the words of the Report of the Committee on Crown Lands, "to prevent waste and wanton destruction of timber and young wood, to prevent unlicensed cutting, and the squatting and congregating of improper persons at the forest," all which evils will be the inevitable consequences of the re-opening.

'4. Because the wood trade is now barely remunerative, and the present prices cannot be permanently affected without serious injury to the producers, whilst it may be shown that wood has not risen at all in price during the last eight years (since the closing), like all other articles of general consumption.

'5. Because the re-opening will have the direct effect of making the wood-cutting interest paramount in the district, to the manifest injury of farming and agriculture, which now constitute, here as elsewhere, the real source of wealth.'

'But,' writes Mr H. B. Darnell, in a communication made to a Committee of the Legislative Assembly appointed in 1866, to consider and report on measures of retrenchment in the expenditure of the Government, 'no opposition was of any avail,

* The opening of the Knysna and Lange Kloof road, which runs through the heart of the forest for twelve miles, subsequently voided this objection.

and the forests were re-opened in 1856, under a staff of Conservators and Rangers, without regard to justice or expediency.

'The consequences may be summed up in a very few words. Government entered into a competition with the private owners of forests, ruinous to both. The production of waggon wood and timber soon became excessive, and the price fell from year to year until it is now unsaleable at half the old established rates. The wood-cutters, as a class, are worse off than ever, and the deplorable state of destitution in which they are now to be found should long ago have attracted public attention with a view to their relief. Conservation (except perhaps at the Zitzikamma end) is a perfect farce, and has entirely failed either to prevent unlicensed cutting or the useless destruction of wood. It was soon found necessary to raise the license from £1 to £1 10s, as the annual revenue would not otherwise have reached one-tenth of the estimated sum of £4000, and it has been falling off gradually until last year, when it exhibited the following results:—

	RECEIPTS.	EXPENDITURE.
	£ s. d.	£ s. d.
George	132 3 9	234 0 0
Knysna	738 0 0	422 0 0
Zitzikamma, &c.	400 0 0	594 0 0
Stationary	... ...	25 0 0
Transport	... ...	60 0 0
Total	£1,270 3 9	£1,335 0 0

'Showing a deficiency of £64 16s 3d upon the receipts, which may be taken as the premium we are at present paying annually to ensure the total destruction of our only valuable forest, the impoverishment of all the people within its boundaries, and the infliction for ever of a great annual loss upon the Colony at large. Such is one only of the many effects of hasty and ignorant legislation in this country.

'The forest lots, as surveyed in the forest of George and the Knysna, were valued at from 5s to 15s per acre, which were

the upset prices. Taking 5s as the average value per acre, the remaining 90,000 morgen of this forest alone, if sold, should produce £45,000, and at a quitrent of £4 per 1000 morgen would yield an annual revenue of £360 per annum.

'Assuming that each of the other sections of the forest country, viz., the unexplored portion beyond Plettenberg Bay, and the Zitzikamma at its eastern end, are each of the same extent and value (and this is probably far within the mark), we have 270,000 morgen of the most valuable land in the Colony, representing a capital sum of £135,000, not merely lying waste, but undergoing a process of rapid annual depreciation, to the manifest loss and injury of all concerned.'

In 1855 the Hon. Major Hope, the Auditor-General of the Colony, was appointed a Special Commissioner to visit certain of the forests. He was unable to do so; but he consulted with the Civil Commissioner of George, and with the Conservator of the Crown forests in that district, and proposed a series of regulations, which were sanctioned by the Governor, and published in the *Government Gazette* on the 5th February, 1856. They were entitled: *Regulations for opening the Crown Forests in the Division of George by License*, and were as follows:—

'1. The licenses are to be issued by the Conservator of Forests, who will account monthly to the Civil Commissioner, paying the amount of the collections during the month on the last day thereof, or as soon after as possible.

'The Conservator of Forests (who shall be required to furnish security to Government for his collections) may appoint four assistants, as Rangers, with power of suspending or dismissing them, assigning a district to each. He may authorise his assistants to issue licenses in the form annexed in his name, and upon his responsibility, he being solely accountable to the Civil Commissioner for the amount of all licenses so issued.

'2. The sum to be charged on each license for a load of wood shall be £1, to be paid before the license is issued.

'3. Each license must specify the description of wood to be

felled and removed under the license; and no license shall cover more than two loads of any kind of wood. It must also state the number of men intended to be employed in cutting the quantity specified.

'4. When a license has been obtained to cut timber in any allotted part of the Crown forests, it must be presented to the Ranger of that part of the forest previously to any wood being cut, on pain of forfeiture of the license, and any other penalty which may be imposed for breach of these regulations. The Ranger will register the license in a book to be kept for that purpose, and with which he will be provided by the Commissioner. The Ranger will likewise endorse the license, and return it to the holder, who will then be at liberty to cut the description of wood specified in the license, on the spot pointed out to him by the Ranger.

'When the wood is removed, the license must be delivered back to the Ranger, who will note on the back thereof the day on which the wood was inspected by him, and allowed to be removed.

'Licenses when thus used will be forwarded monthly by the Rangers to the Conservator, who will preserve them.

'5. Each holder of a license to cut one load of wood shall be entitled to take sixteen oxen to the forests, and to graze them on the adjacent Government or other lands under servitude of grazing the cattle of wood-cutters, for ten days, after which period oxen must be removed from the grazing ground, till the wood is ready to be removed. The Rangers will be particular in enforcing this regulation, which should only be relaxed in the case of sickness, accident, or very bad weather, proved to the satisfaction of the Commissioner to have prevented the men from working.

'6. No timber is to be removed from the place where it is worked, nor is any to be sold till it has been inspected by the Ranger, and the proper endorsement made by him on the license: nor is any timber to be taken to any private homestead to be dressed. This must be done on the ground before the forest.

'7. A load of waggon wood shall consist of two complete loops of wood.

'A load of yellow wood shall consist of 80 cubic feet, if in log, or of 50 planks of 20 feet 12 inches × 1 inch.

'A load of stinkwood to consist of 10 planks 20 feet 12 inches × 3 inches, or 50 cubic feet.

'8. The Crown forests in the division of George shall continue, as at present, to be divided into four wards, to each of which a Ranger shall be appointed, under the control and supervision of the Conservator. In each of these wards a portion of forest shall be marked off by the Commissioner, in which places only is any timber to be cut under the licenses to be issued; and each license must specify the ward in which the applicant wishes to obtain the timber—and his license shall hold good only in and for that particular ward, under the regulations above specified.

9. 'The time and service of the Rangers is to be given exclusively to the Government, for the supervision and proper preservation of the forests. It will be their duty to point out to each holder of a license the ground on which the timber may be felled; to see that it is worked up, or dressed, at the forest: that none is removed without his inspection and permission; and that no unnecessary waste or destruction of timber and young trees is caused by the wood-cutters.

'The Rangers are to keep a register of all licenses presented to them, of the number of persons employed in the forests in their respective wards, of the number of oxen brought from time to time by the wood-cutters to the forests, and of the quantity and description of wood removed.

'10. They are to apprehend and convey to the nearest Magistrate, or Justice of the Peace, all persons found damaging or unlawfully trespassing in the forests, with intent to damage or cut down any of the timber therein.

'11. The licenses of £1 are intended to cut the hard woods used for manufacture, and such are generally known as the valuable woods of the Colony; but licenses to cut loads of inferior woods for spars and fencing, will be issued in a similar manner, and under similar restrictions, at 5s per load. No

yellow, assegai, or stinkwood trees are to be cut for spars. This license to extend for two clear days.

'12. Any licensed person contravening any of these regulations shall forfeit his license, and all wood felled and not removed at the time of such forfeiture.

'NOTE.—A loop of waggon wood consists of the following pieces at the prices set opposite:—

2 Axles, ...	at £0	6	0
2 Schamels, ...	0	3	9
1 Draaiboard, ...	0	1	6
2 After Tongs, ...	0	3	0
1 Fore do., ...	0	3	0
32 Long Spokes, ...	0	7	6
20 Short do., ...	0	3	9
1 Long Waggon, ...	0	1	6
1 Disselboom, ...	0	1	6
24 Felloes, ...	0	18	0
4 Traces, ...	0	4	6
4 Biscot, ...	0	12	0
6 Leerbooms, ...	0	11	3
	£3	17	3

Two loops of waggon wood, value £7 14s 6d, make a load.
50 planks of yellow wood, value £7 10s, make a load.
10 planks of stinkwood, value £7 10s, make a load.'

The following is a copy of a Report with which these proposed regulations were accompanied:—

'*Report of the Honourable the Auditor-General of the Regulations to be adopted for opening the Crown Forests in the Division of George.*

'Presented to both Houses of Parliament by command of His Excellency the Governor.

'The Honourable the Colonial Secretary, Cape Town.

George Town, 22nd December, 1885.

'SIR,—I have the honour to report, for the information of His Excellency the Governor, that, agreeably to his instructions, I have consulted with the Civil Commissioner of this division, and with Mr. Haswell, the Conservator of the Crown Forests

of George, as to the proper regulations under which the Crown forests should be opened;—and I have the honour to submit the annexed regulations, which appear to me to be sufficient for the protection of the forests, and not oppressive upon persons wishing to cut timber under a license, as proposed.

'2. These regulations are approved of by the Civil Commissioner and the Conservator.

'3. I have to apologise for forwarding them in their present rough shape and form, but I have not had time to make a fair copy of the draft, nor to arrange and classify the rules. If, however, the substance of the regulations is approved of by His Excellency, these draft rules could easily be put into better form and language.

'4. Regulations Nos. 10 and 12 will probably require to be revised by the Attorney-General, as no fines or imprisonment could be inflicted for breach of these regulations without they were embodied in a law. Therefore, perhaps, all that could be done at present, under a Government notice, would be forfeiture of the license and timber, for breach of the agreement under which the license was obtained.

'Persons convicted of cutting without a license could be punished, as at present for theft.

'5. Regulation No. 9 I consider absolutely necessary. At present the assistants, whom I have designated as "Rangers," receive only £3 a month, and of course their whole time is by no means given up to to the supervision of the forests; they merely go along the edge occasionally to see, by the marks which timber makes in being drawn out of the forest, if any has been removed.

'Under the proposed regulations, their duties will be very different, and must occupy their whole time. It will be necessary therefore to put these Rangers upon a new footing, and to give them salaries sufficient to command their services exclusively for the working of the system of granting licenses, and to ensure the due performance of the responsibility imposed.

'The wards under the charge of these Rangers are of considerable length, and they are obliged to keep horses.

'The Civil Commissioner and the Conservator are of opinion that when the forests are opened, these Rangers should receive salaries of £90 a year. I do not think it should be less.

'I am further of opinion that, from the nature of the duties of the Rangers, their appointment should be left entirely to the Conservator, who should also have the power to dismiss them. In fact, that he should be allowed four Rangers, submitting their names in the abstract for salary, but that they should have no claim upon Government for their services as Rangers.

'The duty would thus be better performed by making the Conservator solely responsible; and upon any change of the system at any future time, by which these men's services were dispensed with, the Government would not be bound to provide for or to pension them.

'6. The duties of the Conservator would necessarily be much increased, and I think his salary should also be increased. He resides at the Knysna, as a central position for a supervision of the forests. I would propose that his residence should be fixed at the Knysna, and that he should be allowed an office and stationery. His salary at present is £144 a year, with a forage allowance for 3 horses, he having a range of 150 miles in extent under his charge.

'This is a small salary for a gentleman to subsist upon; his duties expose him to considerable fatigue and exposure to weather, even now, but these will be greater when the forests are opened. I will presently revert to the increase I would propose to the salary of the Conservator.

'At present the expense of keeping the forest closed is as follows, viz. :—

Salary of Conservator, ...	£144
Allowance to do., for 3 horses, ...	82
4 Assistants, ...	144
	£370

For which expense of outlay no return is received.

'7. Mr Haswell estimates the number of licenses which would be taken out annually at 1500, and he founds this upon the

fact that the number of loads which at present pass through the toll, leading from the private forests, is about 100 a month. An additional 300 loads a year when the forests are open, I consider a moderate calculation.

'I have proposed that the four Rangers should receive £90 a year a piece, or £360 for their salaries.

'I consider that £300 a year, with the present allowance of £82 for horses, would be a fair salary for the Conservator, thus making the expenses of the control of the forests, when opened, to be £742 a year; to this add office rent, £30 a year, and the total would be £772 a year,—about half the estimated amount of the revenue to be derived from the issuing of licenses to cut timber.

'8. The opening of the forests would bring a large number of people to the woods and their vicinity. These would be a wandering, unsettled, and not always a steady class of men. They would bring with them large numbers of cattle—disputes might arise with regard to pasture, and even as to trees and loads of wood, and from many other causes, which would require prompt and sufficient authority to suppress. I would therefore venture to propose that the Conservator of the forests should be made resident Magistrate for the Knysna district, upon the salary as I have proposed above, viz.:—£382, as Conservator and Magistrate. There is at present a lock-up house at the Knysna, and it has been recommended by the Parliament as a seat of magistracy.

'9. It may be objected that the Conservator should try offences committed under the forest regulations,—but the Superintendent of Police in Capetown tries offences committed under the Police Laws, and prosecutes before him by his own officers. The same is the case with the Stipendiary Magistrates in Ireland, and the Police Magistates in London and Liverpool.

'Far from being objectionable, I think the Conservator is the proper person to entrust with power to enforce the regulations necessary for the preservation of order in the forests, and of the forests themselves. This matter, however, I submit for the consideration of His Excellency. . . . . .

'10. In regulation No. 5 the number of oxen to be taken to the forest is stated as sixteen for each load—this is the usual number in a span for such purposes; and the time they are to be allowed to remain under each license is limited to ten days. This is intended to prevent persons idling at the forests in preparing their loads for the purpose of grazing their oxen. It is calculated that four men can easily prepare a load of wood in six or eight working days. Ten days was therefore considered as a fair average time; but in case of sickness, accident, or very bad weather, preventing the men from working, I think the Conservator should be empowered to extend the time of the license being in force, and allow the cattle to remain a reasonable time longer.

'11. There are some farms in the neighbourhood of the forests upon which there is a servitude that the cattle of wood-cutters are to be allowed to graze. Complaints have been made to me by some persons thus interested that by the opening of the forests their farms might be overrun with cattle, and the grazing destroyed.

'What was originally intended as a reasonable servitude may, from change of circumstances, become oppressive; still the farms are held under servitude. It may be desirable to relieve them from the abuse of servitude, but not to take it off entirely, as that might injure the operations of the wood-cutter.

'The Civil Commissioner concurs with me in suggesting that the pieces of Government pasture lands adjoining the forests should be reserved for the oxen of the wood-cutters, which would relieve the farms under servitude of grazing, that these spots should be pointed out by the several field-cornets to the Rangers, and where they are sufficiently near to the patches of forest marked out for the wood-cutters with licenses to fell timber in, they should be restricted to those grounds for pasture and not allowed to make use of the ground on private farms under servitude, unless the Government land was insufficient, or too far from the places where the cutters are at work.

'Where no other pasture can be obtained but the private under servitude, then we think it would be well if the field-cornets marked off a sufficient extent for the grazing of the

wood-cutters' oxen, and that they need not be allowed to roam over the whole farm.

'If, however, sufficient pasture cannot be obtained without the whole of a farm is used, then the owner must submit to the servitude under which it is held, and if thought just, some compensation in land, or otherwise, might be granted to him.

'12. I regret much that I have not been able to visit the Knysna, and see more than I have done of these noble natural forests; but as it was not necessary to enable me to make this report, and would have been merely a gratification of my love of nature and of scenery, I have felt that my duty required me to proceed on to perform other matters which have been given me to do. Without, therefore, having had the satisfaction of seeing the great mass of Crown forests at present closed, I can well believe their reputed extent and value. Considering these two points of extent and value, I feel anxious that they should be opened under good regulations, and that a constant supply of valuable timber soould be, for ever I may almost say, preserved to the Colony.

'These objects I am convinced cannot be obtained without the strict observance of proper regulations, and this cannot be obtained without adequate payment to trustworthy officers. I would venture therefore to hope that the salaries I have proposed will not be considered too high, when the great interests involved are also considered.

'Even supposing that, under the system and expenditure thus proposed, scarcely any or no revenue was derived beyond what covered expense of supervision, still I think the Colony would gain and be benefited, for I consider that by opening the forests, every additional waggon which may thus be built, every additional house built and room floored, are great gains, both socially and financially, to the Colony, and will ensure more lasting benefits than any annual revenue derived from the issue of licenses.

'13. I have now only to allude to what may be called the natural complaints of those who purchased lots of forest land from Government when the forests were closed. It is alleged that

the Government notice held out, as an inducement to purchasers, that the forests would not again be opened.

'I cannot agree that any such promise is given in the notice referred to, although it may have been generally understood that such would be the case; and I have no doubt that such was the intention and policy of the then Government. But it never can be held that even a promise, if such was given, was for ever to bind successive Governments, more especially after the change which has since taken place in the form of the Government of the Colony, and that the forests were to be for ever closed and left unproductive, and for the sole benefit of the few elephants still left as remnants of past years, and as fit inhabitants of these vast forests of nature, parts of which would be inaccessible to man but from the paths of these same elephants.

'I have argued the matter with some of these proprietors, who admit that the forests could not be closed for ever; but they think the opening of them now a hardship to them, as purchasers under the belief, if not the promise, that they were secure in the profits to be derived by the purchaser from the closing of the forests; and they have asked if the Government would not give them compensation.

'I answer, you can represent your case, and the Governor may perhaps lay it before the Parliament, and you would ascertain if the Legislature thought that compensation was due to you, but that I much doubted it.

'A memorial may therefore be presented to His Excellency.

'I have given as my opinion to these purchasers of Government forests that if compensation was entertained, I thought it could never be given according to the loss of profit they anticipate, nor that such a principle would be reasonable, but only by returning a percentage of the purchase-money paid for their lots.

'There was one case, however, represented to me by the Archdeacon, which differs from the others, and I think could be equitably dealt with.

'It appears that the clergyman at the Knysna obtained a piece of forest from Government in consideration of his

relinquishing a portion of his annual stipend. If the opening of the forests would injure his interests in this compact I think there could be no objection to his returning the forest land to Government, if it remains as when granted, and has had no timber removed from it; and he being allowed to resume his original salary. But in a worldly view it would probably be for his interest to adhere to his bargain.

'14. I enclose a memorandum, which I requested Mr Haswell to furnish me with, of the different trees of value for trade in the forests, of their mode of growth, and age at which they are fit for use.

'15. I have added at the end of the regulations a statement of the quantities of each description of wood forming a load and of the fixed prices which each bear on the spot, or, as it is termed, "before the bush" or forest.

'These prices, it seems, never vary, and they are as much a guide to the Rangers as the quantity or measurement. It is necessary, therefore, that both should be expressed and understood in the regulations by both parties.

'16. I have only further to suggest that the Conservator should be provided with an ample supply of printed copies, chiefly in Dutch, of the regulations that His Excellency may decide upon, and that the Rangers should be instructed to explain them fully to persons presenting licenses to cut timber.

'I am not aware that I can suggest anything more, or give His Excellency any further information to enable him to issue the necessary regulations for opening the forests.

'I have the honour to be, Sir, your obedient servant,

'WM. HOPE,

'Auditor and Special Commissioner.'

This report, together with the regulations suggested and approved, are cited as illustrative of what was the state of the forest service, and what were the views in regard to forest economy entertained in the Colony at that time, little more than thirty years ago.

Apparently the forest lots which had been surveyed and sold, or offered for sale, were all of them situated in the district of

George alone, and that they comprised the whole, or nearly the whole, of the forests in that district, as it is now constituted.

In 1856 all which had not been disposed of, and the forests situated elsewhere, were in accordance with these regulations re-opened for felling under licenses, for which a charge of £1 was made, and a staff of Conservators and Forest Rangers was appointed. It was afterwards deemed expedient to raise the charge for license from £1 to £1 10s.

Some lots were subsequently sold; but the practice was again stopped.

In return to an address of the House of Assembly to His Excellency the Governor, dated 10th May, 1861, asking for the reports of the Civil Commissioners of George and the Knysna, as Conservators of Crown Forests for the year 1860, together with a statement showing the number of licenses issued for felling timber since the opening of the forests and the amount received for the same, the following report was made :—

'Return showing the number of licenses to fell timber issued since the opening of the Crown forests in 1856, and the revenue realised thereby.

	No. of Licenses.	Amount.
Issued during the year 1856	488	£471 7 2
Do. do. 1857	554	616 10 11
Do. do. 1858	345	374 11 3
Do. do. 1859	191	208 16 7
Do. do. 1860	322	310 7 7
Total	1,900	£1,981 13 6

J. C. DAVIDSON, C.C.

'N.B.—The years 1857, and four months of 1858, included the Knysna forest, since under charge of a separate Conservator.'

To this the following report on the forests in the district of Knysna, since its creation into a separate division, commencing from the month of May, 1858, to the 31st December, 1860 was appended.

'From the formation of the district as above stated up to the month of August, 1858, the Civil Commissioner of Knysna had the entire charge of the Crown forests for the districts of George and Knysna. After the latter period, the Civil Commissioner

of George was appointed Conservator for his own district, which measure has resulted in a much better supervision of the forests in both districts.

'There has been a gradual increase in the issue of licenses, as will be seen by annexed return. This is in a great measure owing to the demands for Iron-wood for the works at Port Elizabeth and elsewhere, of which a continuance may be fully expected, and there is no reason to doubt that, if a good road existed between this place and George, there would be a further increase in the licenses, as a large quantity of timber would then find its way westward; but when the contemplated road from Knysna into Lange Kloof is completed, a very material increase to this portion of the revenue will be the result; even now, in spite of the dangerous and difficult state of the present road into the interior, much timber is transported to the northern districts, though only half loads can be taken at a time.

'At the time that the licenses were increased from £1 to £1 10s, as recommended, there was a great outcry that the trade in timber would be affected thereby; this has not been the case; and, although there has been an increase in the licenses, the diminution of available timber is scarcely perceptible, in consequence of the large extent of forest wood in this district.

'The rough road already formed through the main forest has given the wood-cutters access to the more distant portions of the forest, which were hitherto untouched.

'A plan has been adopted by the Conservator of allowing men of good character to squat on the Government ground adjoining the forest, which has been the means of securing the services of several wood-cutters, who at one time, were very scarce.

'Return of revenue and expenditure of Crown forests, Knysna, from May, 1858, to December, 1860.

From May, 1858, to Dec., 1858, 650 licenses were issued; revenue				£649	12	2		
Expenditure—Salaries to 5 rangers of forests	£216	0	0					
Allowance to conservator	54	13	4	264	13	4		
Net revenue							£384	18 10

1859—690 licences were issued; revenue therefrom				£1,035	4	7		
Salaries to 3 rangers ...	£315	0	0					
Allowance to conservator	82	0	0	397	0	0		
Net revenue							£638	4 7
1860—924 licenses issued; revenue				£1,386	10	0		
Salaries to 3 rangers ...	£369	0	0					
Allowance to conservator	82	0	0	451	0	0		
Nett revenue							935	10 0
From May, 1858, to the 31st December, 1860 (a period of 2 years and eight months), net revenue							£1,958	13 5

JAMES FICHAT, Conservator of Forests.

Knysna, 22nd May, 1861.'

Dissatisfaction still continued. A good deal of information in regard to successive phases of the management of the Crown forests by the Government of the Colony was collected by Mr H. B. Darnell, a member of the Legislative Assembly, who took a deep interest in the matter, and who had himself become a holder of forest property. Much of this information he embodied in a statement made by him in Parliament towards the close of 1866, in the course of a discussion there on the proper disposal of the Crown forests. And the substance of this statement was afterwards published by him in a pamphlet entitled: *The Past, Present, and Future Condition of the Forests in the George, Knysna, and Uitenhage Districts.* In this, amongst other things, he says:—

'The forests of most importance in the Colony are those of George, Knysna, and Uitenhage districts, which extend along the coast in a continuous line from George almost to St. Francis Bay, and are separated from the interior by a range of mountains. The length of this tract of forest country is about one hundred and fifty miles, by an average width of ten miles, giving an area of fifteen hundred square miles. Half of this extent is forest and the rest grass. The open veldt is generally of the description called sour, though mixed and sweet veldt is by no means uncommon. There is a vulgar prejudice against sour veldt, which will disappear when its more enduring

qualities are better appreciated. Large profits are not to be made in this part of the country by breeding sheep or growing wheat. But every kind of stock may be kept, and every kind of grain grown. There is no branch of agricultural industry that may not be pursued with fair success, and if one should happen to fail, there are always the others to fall back upon. A few years ago (not twenty) there were no sheep in the neighbourhood of George. Now sheep thrive there exceedingly well. At Plettenberg Bay and the Knysna there are also a good many sheep farmers. The climate is moist, irrigation is not required in average seasons, the soil is generally fit for arable purposes, and this tract is consequently better adapted to bear a large agricultural population than any other portion of the Colony. In the late droughts some thousands of cattle and horses were saved by being brought in here from the interior districts. There are two excellent harbours, viz., the Knysna and Plettenberg Bay, besides numerous small bays suitable for fishing. It is a curious circumstance that the central part of this forest-tract, between 400 and 500 square miles in extent, still remains almost unexplored. Those who have traversed it pronounce it to be a very fine country, half grass and half forest. It was here we might have located those Highland emigrants who touched at the Cape, at several different times, on there way from Nova Scotia to New Zealand, in search of a home, could we only have made up our minds to part with our waste and useless lands without a consideration. It is only now that we are beginning to realise the fact that the value of such lands does not consist in the paltry sum for which they may originally be sold, but in what they yield to the State when fully occupied and utilized. As wood-cutters, fishermen, and agriculturists, these Highlanders would long ago have turned a wilderness into a thriving and populous settlement.

'Perhaps a few words may be said about the woods produced in these forests. Yellow-wood was formerly much more used than now. Yellow-wood beams and floors are to be found in all the old houses in Capetown. Its use has been of late years almost superseded by foreign deals, which are certainly superior for general purposes Had the member for Namaqualand (Mr

Foster) had his own way, in the supposed interests of the working classes, and the duty been entirely taken off imported timber, our native woods would have been still more excluded from the market. Cedar wood * from the Cedarbergen in Calvinia district seems to have been formerly a good deal used. It is now a very scarce wood. It may often be seen in the old-fashioned Cape furniture that finds its way on to the Parade. Stinkwood, which is very abundant, is a wood quite equal to Teak for all the purposes for which the latter is employed, but owing to its hardness it is not equally popular. Red and White Els are extremely valuable woods, but White Els has already long been a comparatively scarce wood. Various kinds of woods are used in the manufacture of a waggon, and there are many others whose economic uses are not well ascertained. It is only very recently that we have succeeded in introducing Iron-wood for piles in harbour and other works. The timber which has been used in the construction of the Table Bay breakwater has nearly all been imported, and might very well have been supplied here. Railway sleepers were at first imported, but are now procured here of very superior quality, at a price which pays nobody engaged in their production. Supposing foreign timber to be shut out of the market—which of course no one desires—the forests of the country could probably supply the whole demand. But how long they would continue to do so under the present system, when the destruction is so great, and no attempt is made to renew the supply, is another question. Probably far within fifty years the country would find itself in serious straits for want of timber.

'The history of the forests, up to 1847, may be shortly stated. There appears to have been for some time a tax of one

* Sir James Alexander, in his exploring expedition into the interior of Africa (Vol. I. p. 230), in making mention of the *Cedar Tree*, remarks that one of them was cut down in 1836, which was 36 feet in girth, and out of whose giant arms 1000 feet of planking were sawn. He bitterly complains that this noble tree is fast disappearing in the Cedar Mountains. Mr W. von Meyer, another South African traveller, says that in former days the whole of the mountainous chain to which the Cedar Mountains belong, was studded with these trees, but that of late the *axe* and *conflagrations* have done their *utmost to destroy these valuable forests*.—*Pappe's Silva Capensis*.

rix-dollar a load levied in the George forests, the proceeds of which went towards the building of the Dutch Reformed Church in George. In 1811 the forest in Plettenberg Bay was reserved for the use of the naval building yards. In 1812 a large section of this forest in that neighbourhood was closed altogether, fear having been already expressed about the growing scarcity of timber. In 1820 a number of transports were sent with timber to England for shipbuilding. It was not approved of, and the Naval Reserve was given up in consequence. Subsequently the forests seem to have been declared open, under certain conditions. Wood-cutting was the only industry pursued, and wood the only currency. Two felloes, or half-a-dozen long spokes, was, for instance, the price of a bottle of brandy. A license of six shillings was charged upon a load of wood worth from £10 to £12 in goods ; but the wood-cutters appear to have been always a poverty-stricken race, living from hand to mouth. The difficult nature of the country, the bad roads, and the disadvantages under which they exchanged their wood for the necessaries of life, accounted sufficiently for their condition. Little or no supervision was exercised in the forests, and no revenue was obtained in excess of the expenses. To this wretched state of things the late Mr Montague's attention was directed. The forests were closed by his suggestion in 1847; the whole of them in the then George district were surveyed, divided into lots, and offered for sale, like any other lands, and the Government notice above quoted was issued. It was always understood that this notice gave a pledge to the public that the forests should not be re-opened, and in 1859 a Select Committee of the House recommended compensation for a purchaser who had been injured by the re-opening of them by Parliament itself. The beneficial effects of this measure were soon felt. People began to buy land and forest. The wood-cutters, who had always been squatters "before the bush," settled generally on the neighbouring farms where they hired land, and went to cut in private forests at the proper seasons of the year. Their condition was much improved, and in many instances they began to accumulate a little property, which has since been lost. The wood trade

became remunerative, to some extent, to all concerned, for the first time in its history, and the country was in a fair state of prosperity and progress. The first table quoted above shows that the forest that had been surveyed was selling rapidly at good prices, one-fifth of the whole having been sold in six years, and the greater part would no doubt have been in private hands by this time could Parliament have only let well alone.

'But when we obtained that inestimable "boon," a free Constitution, our first Parliament undertook to put everything to rights that had ever been wrong, and the "Crown forests" of the Colony did not escape its notice. An agitation was got up by two or three persons in George in favour of re-opening the forests, under the vague notion that George, which had been declining ever since the main road to the Frontier was diverted from it, would gain something by the measure. The sales of forest were stopped by order of Parliament, during inquiry. Petitions were got up, based on the communistic notion that the forests belonged of right to the wood-cutters, in which it was shown that the re-opening would destroy the monopoly said to be enjoyed by those who had purchased forests, would make timber very much cheaper, and would create a revenue of at least £4000 a year from the George forests alone, by the issue of licenses at £1 each. I now quote from a document (signed by G. W. Dutton and three others), which, as alleged by him then, most influenced the Crown lands Committee to report in favour of re-opening, in order to show what kind of opinions had most weight with them:—

'"The Government never contemplated the exclusion of the public from the enjoyment of the profits of the forest, and the advantages to be derived therefrom. . . . . A few lots only have been sold, and the poor wood-cutter, with the forest closed around him, was forced to submit to the exactions of the monopoly thus created. . . . . Thus, instead of becoming a useful member of society, he is shunned and dreaded as a bane to mankind. . . . . The present Parliament is not responsible for and bound by the acts of the former Governments, and, as conservators of the public property

and guardians of the public interests, are necessitated to entertain the question, as involving matters of the greatest importance to many districts of the Colony, and having the disposal of the remainder of the forest lands, they are bound to exercise that right consistent with the claim so large a portion of the population of this district has upon the Government of the Colony.

'"Another, and a consideration of great importance, arises: Are these forests of value as a branch of the revenue or not? You have it as a fact that thirty years ago at least 2,500 loads were cut annually in the forests of George; but what has been the increase since? Taking a very low estimate, 600 individuals earn their living by wood-cutting. Allowing that each could cut and dress one load per month, we have 7,200 loads per year. We may fairly take the half as a very low estimate. This, by increasing the license to £1 per load, would yield a revenue of £3,600 per annum. An increased number of officers would be required, for which we allow an estimate of £600 per annum, leaving a clear revenue of £3000 per annum, and, with a careful supervision, an exhaustless one. . . . . Compare this statement with the present state of affairs. A few plots of forest have been sold, and are lost for ever to the country, in consideration of a sum of ready money, but in order to preserve the remainder an expense of £371 is incurred, for which no return whatever is shown as an equivalent.

'"To sell a valuable income cheaply for ready money may serve very well to supply the immediate wants of a sinking purse; but where will the purse be supplied from after all these properties have been sold? The purse is now no more so light [*sic*], and it becomes the duty of the Parliament to secure, by means of yearly revenue from the Colonial property, as much as can be obtained for the purpose of avoiding taxation, direct or indirect, as much as possible; but when, as in this instance, a great blessing to the Colony, an act of justice to a large number of injured men, can be blended with such a desirable object, no doubt can arise as to the course the Government should pursue."

'Had I time or space I could show that nearly all the argu-

ments used in this document in favour of re-opening the forests apply with infinitely greater force against the measure.

'Several gentlemen were also invited to give their opinions in writing on the subject.

'Mr Meintjes, M.L.A., "thought it was only just that the public should have a cheap supply of wood, and that re-opening the forests would give a revenue almost equal to a perpetuity."

'My answer to that is, wood is cheap enough, but there is no revenue and no perpetuity.

'Mr S. Hartman, M.L.A., "was in favour of re-opening, and recommended the re-planting of trees."

'Mr Swemmer, M.L.A., cried out for "justice to the public and the public revenue, and averred that the licensing system would give an income of between £2000 and £3000 for years and years to come in George alone."

'I also ask for justice to the public and the public revenue.

'The Hon. Mr Barrington said—"The forests would be a curse to the land owners if they were re-opened, and that the Parliament was unsettling everything that had been settled."

'Mr Christie, M.L.A., "thought it infinitely preferable to see such lands in the hands of individual proprietors; and that the superintendence of the forests would cost much less when closed than when open."

'These views are so obvious and so sound that they need no recommendation from me.

'Lastly, I was myself permitted to give my own views, and I will quote the concluding paragraph of my own communication, as it sums up the whole:—"The opening of the forests is naturally a popular measure in the neighbourhood of them, but, in my humble opinion, it is one calculated to cause serious injury, not only to the districts in which they are situated, but eventually to the whole Colony."

'Then a few witnesses were examined before the Crown Lands Committee, and, amongst others, Mr Stretch, M.L.A., who was also in favour of re-opening, if the faith of Government had not been pledged to purchasers in George; and Mr G. W. Wehmeyer, M.L.A., who "thought that if the forests

were opened about two thousand licenses would be immediately applied for, almost on the first day,"—a feat that I do not believe has been performed in one single year. In my own evidence I endeavoured "to impress upon the Committee that this was not a wood-cutter's question, but a question in which the whole country was interested. The wood-cutters' interests were not to be alone considered; the question simply is, whether we are to have a constant supply of wood at fair rates, or to have wood cheap for some years, and be afterwards obliged to import it, or pay for it here at enormous prices, on account of the scarcity that must ensue."

'But,' says Mr Darnell, 'no opposition was of any avail, except to stave off the evil day for another year.

'The Crown Lands Committee reported in favour of the opening in the following terms:—

'"The Crown forest lands should not be sold, but licenses to cut timber, waggon wood, and other wood in them should be granted at a rate not exceeding £1 per waggon load. Proper and fit forest rangers should be appointed in the different divisions where there are forests worth preserving, to superintend those forests, to grant licenses, to prevent waste and wanton destruction of timber and young wood, to prevent unlicensed cutting, and the squatting and congregating of improper persons at the forests.

'"Strong objections have been made to the opening of the Crown forests for licensed timber cutting, generally, almost exclusively, by persons having property in neighbouring forests, who seem desirous to monopolise the supply of timber to the public. Your Committee cannot, however, see any sufficient grounds for admitting such claims, and not allowing all persons who may require it to obtain wood from the otherwise useless forests,* on such equitable terms as may meet the wants of the public, and at the same time increase the revenue of the Colony."

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* *The otherwise useless forests!* What a slur these words convey upon the capacity of our first Parliament for legislation!

'The Government, as represented by Mr Rawson, Colonial Secretary, bent upon pleasing what was supposed to be the popular party in those days, bowed and gave assent to a measure which they ought to have resisted as a breach of faith, and a public as well as private injustice. The forests were re-opened in 1856. I may again refer to my previous memorandum for the consequences. Wood-cutting is an independent sort of life, and seems such a direct and certain mode of obtaining a livelihood that everybody who could use an axe rushed off to the forests. Other pursuits were abandoned, and labour was withdrawn from the farmers. The re-opening appeared to answer at first in one sense, contrary to anticipation, for wood rose in price instead of falling—a sufficient refutation to the false assertion that it had risen unduly in price whilst the forests were closed. But this did not last long. Over-production soon reduced the price of wood to half the old rates, and the trade in it is ruined; but what does that matter so long as the people at a distance can buy wood for less than the cost of the labour employed in its production? There is probably as much wood cut that pays no license, as does, and if the number of rangers were doubled, unlicensed cutting could not be prevented so long as as the forests are open.

'Whilst destruction goes on apace, the anticipated revenue of £4000 per annum from the George forests alone has never reached as many hundreds from all the forests together; and has now fallen so low that last year it had to be supplemented by £200 to cover the expenses, as may be seen by the second table above, and the "poor wood-cutter" is in a more abject state of poverty than ever! But this is not all. Forest land that was selling formerly at from £1 to 30s per acre is now reduced in value to next to nothing. There is but little inducement to invest capital, or to settle in the neighbourhood, for any other sort of enterprise or industry is next to impossible. The country has been thrown back for many years, nor can there be any prospect of improvement whilst the forest lasts. Instead of being a source of wealth to the people it is a mockery, a delusion, and a snare, and will continue to be a burden upon the Colony as long as it is thought necessary to keep up the farce of conservation.

'The Crown Lands Committee thought the forests should not be sold, and the sale was accordingly stopped, after the forests were re-opened on the license system. A few years ago I succeeded in getting this restriction removed, and some lots of land and forest were subsequently sold. But the sale has been again stopped. If it is asked why Government thus sets aside the law, and interferes with the rights of the people, the answer of course is they refuse to sell because the land realises so little. That is true, but who has reduced land that was worth from 20s to 30s an acre to the value of so many pence? The Parliament and Government, between them. We may wait until the day of doom before it is worth more, under present conditions. But if people are so foolish as to wish to buy with so vague and hopeless a prospect before them, they have a right to do as they please; and every acre of forest sold helps to weaken the profitless monopoly of Government, which must be broken altogether before there can be any general improvement, or any satisfactory reply to the perpetually recurring question—Will the country ever come to anything?

'The throwing open the forests was a failure; it was worse, it was a mistake and an injustice, and ought to be repaired without delay. At best it was a case of killing the goose to get the golden eggs, but the eggs, instead of being gold, turned out to be of wood. This fine tract of country, 1,500 square miles in area, might surely be converted into something better than a profitless waste and an annual charge upon the revenue. The measure I advocate with respect to it is not merely a measure of retrenchment, but is calculated to develop its resources for future revenue. The forest within this tract would realise at least £400,000, if sold at the same rates that were obtained before the re-opening. I propose, *firstly*, that the forests shall be again permanently closed on 30th June, 1867; that the portion not already surveyed, and partially unexplored, should be surveyed, valued, and divided into lots for sale. It is manifestly preferable, for every reason, that they should be in the hands of private persons. The number of proprietors, and the competition between them, will effectually prevent that monopoly which was charged, but unjustly, against

the close system. This is the only way to ensure proper care of the forests, and the certainty of their continuing to yield timber for ever. The utter neglect of the Government, the prevalence of fires, to guard against which nothing is done, and the cutting of wood out of season—for it is permitted all the year round—are only doing the work of destruction too well at present. It may be safely said that the greater part of the wood cut out of season turns out to be unfit for the purpose for which it was cut. The fate which has befallen the cedar forests of Clanwilliam is, sooner or later, inevitable. I may, perhaps, here quote from the reports for 1865 of the Forest Conservators. The Conservator of the George forests says:—"Large tracts of forest lands are at present inaccessible. These lands could be all let or sold to great advantage, if they could be easily approached. . . . . I regret to have to report that several fires have, during the past year, broken out in these forests, and done considerable damage. . . . The only way of effectually checking the destruction of the forests would be to let plots at fair and reasonable rates."

'Of course, the idea of *letting* forests is inadmissible.

'The Conservator of the Knysna forests says:—"The Knysna forests are second to none in the world for their splendid and durable timber. No other country, except India, can produce such woods as stinkwood, ironwood, white els (for ship-building purposes), milkwood, hardpear, assegai; and it is lamentable to see that these are wasted to a greater extent than is necessary. I would beg to refer to my reports of 7th January, 1864, and 15th January, 1864. Should the Government wish, I could supply information as to the proper time to fell particular woods. This course alone will preserve the forests from destruction, and at the same time raise the character of our woods, which is just now at a low ebb. . . . . The wood trade has declined visibly during the last year. The overstocking of the market, the refusal of the Parliament to go on with railway works, or the poverty of the wood-cutters, consequent on the drought, may have had this effect. In any case, be the cause

what it may, there should be a rule as to the cutting of particular timber at certain seasons of the year."

'But the causes of decline are still deeper seated than is here surmised.

'The Conservator of the Uitenhage forests says:—"It is with regret that I have to report the occurrence of two fires in the forests—one at Van Staden's River, the other in the Zitzikamma. The damage done by the latter is truly deplorable, and is a serious public loss. . . . In the Zitzikamma the scarcity of provisions and money are severely felt. Supplies are brought to me from Port Elizabeth, but the ranger and constable are often without bread. The coloured wood-cutters are without employment or provisions, and subsist mainly on fish. I have, however, much satisfaction in bearing testimony to their honesty, as far as wood-stealing is concerned. . . . Reports were made to me that the farmers in Lange Kloof were losing their stock from poverty; I took it on myself to give permission to the sufferers to bring their cattle into the Zitzikamma forest. They are grateful for this timely assistance, and there are now about 600 head running there."

'*Secondly*, I propose that those portions of the forests that are considered to be what is called "cut out," should be retained in the hands of Government, and a scientific Conservator appointed, with the necessary assistance, charged with the work of restoration and protection. This need not cost more than half what the present non-productive supervision costs, and the gain will be ultimately not small as they will come in at some future time for sale. The other portions that are closed need but little supervision, as it is difficult, under these circumstances, to steal wood without discovery. I put down £800 as the future cost per annum of the entire conservation and supervision of these forests.

'*Thirdly*, I recommend that villages, with commonages attached, should be laid out in erven of not less than two acres each, in suitable localities, and granted to the wood-cutters. They are always asking for small pieces of land, and though the claim put forward on their behalf, that the forests belong to

them is inadmissible, still they are well entitled to consideration, and their wants may be readily met in this way. Four of these villages would be enough, one in each section of the forest, which might be left open in their neighbourhood for a time.

'*Fourthly*, I recommend the making of a road, a portion of which has been already sanctioned by Parliament, through the whole forest country from George to the neighbourhood of Humansdorp, upon which destitute wood-cutters may find work, until they can settle down, or find more profitable employment than wood-cutting all the year round. Without this road the country cannot be properly developed. The Knysna and Lange Kloof road nearly crosses it at right angles, and though it goes at a stretch through the heart of the forest for twelve miles, its main object is to give access from a large area of the interior to the Knysna harbour.

'*Fifthly*, the expenses of carrying out these proposals may be defrayed from the sale of forest lots.

'The following resolution was then moved:—"This House requests His Excellency the Governor to appoint a Commission, consisting of one officer from the Public Works Department, and one from the Surveyor-General's Department, to enquire and report during the recess into the expediency, or otherwise, of carrying out the following suggestions."

'Mr. Ziervogel did not oppose inquiry, but did not approve of any change in the present system.

'Mr. Wehmeyer was against any inquiry, and ridiculed the idea of giving land away to wood-cutters.

'Messrs Thomson and Smith both called attention to the evil condition and prospects of the forests in certain Eastern districts, and in British Kaffraria, and the great need of legislation in respect of them.*

'Mr. Munnik was not at all opposed to the proposed measures, but made some statements as to the high price of wood during the closed period.

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* The *Gazette* says that Captain Baron Defin. of Stutterheim, having been appointed Forest Ranger, has made his first tour, and reports that the forests in many parts have been almost destroyed.

'Dr. White moved the additional suggestion (No. 5) which he said was in accordance with the French practice, and which was carried.

'Mr. Wehmeyer moved as an amendment to the original motion, seconded by Mr Walter,—"That, in the opinion of this House, the question of re-closing the Crown forests in this Colony is of great importance, and requires due consideration, and at such a late period of the session, it should stand over for the present.

'Amendment put, and House divided:—when there appeared for the amendment, ayes 3; against it, 24.

'And the motion, as subsequently carried, stood thus:—"That His Excellency the Governor be requested, by respectful addresses, to appoint a Commission to inquire and report, during the recess, into the expediency of carrying out all or any of the following suggestions:—

'"1. The re-closing of the Crown forests in George, Knysna, and Uitenhage districts, the survey of that portion of them not already surveyed, their valuation, and division into suitable lots for sale.

'"2. The establishment of an intelligent system of conservation, under which the forests may not only be preserved, but restored and extended.

'"3. The laying out in suitable localities of villages, in erven of not less than two acres each, to be granted on a small quitrent to wood-cutters now squatting in the forest.

'"4. The completion of a road along the coast from George towards Humansdorp, through the whole length of the forest, in order to open up the whole country thoroughly, upon the making of which road destitute wood-cutters and others may find employment at a moderate rate of wages.

'"5. (Dr. White's) The division of the forests into a certain number of compartments, say twenty or more, and only one of these allowed to be open yearly, so that each compartment, when closed, would rest during the same number of years as there are divisions, and would thus have time to be reproduced.

'"5. The expenses to be defrayed from the proceeds of the sale of forest lots."'

It does not come within the sphere of my purpose to discuss the remedial measures proposed by Mr Darnell, or the merits of the measures adopted by the Government to which he refers. I confined myself to the compiling of statements of fact, inclusive of statements of the impressions produced on intelligent observers by what had been done, and was being done, as time passed on, in connection with the management of the Crown forests of the Colony. I deem it preferable to give the statements of these impressions in the words of the observers than to give a summary which might reflect more or less my own views and sentiments on the matter.

CHAPTER III.

APPEALS FOR A MORE EFFICIENT CONSERVATION OF THE CROWN FORESTS.

THE statement of Mr Darnell, which has been under consideration, was made in the close of 1866; and it brings up to that time the discussion of the question to which it related. In so far as it relates to that question it may be accepted as complete; but the more comprehensive subject of the management of the forests under the old regime makes it necessary to fall back and bring under consideration matters which did not concern his argument, relating primarily to the administration, and only incidentally and slightly to the management of the forests.

Irrespective of the questions raised by the mode of disposing of forests and forest products by the sale or retention of the forests, and by closing the forests against the operations of wood-cutters, or licensing such on payment of specified fees—though perhaps arising out of the last mentioned sanctioned exploitation—there arose questions relative to the extent of waste which was seen accompanying and perhaps occasioned by the system of exploitation followed.

The method of exploitation followed then, and continuously under the old regime, was that designated in France *Jardinage*, in which there is pulled here and there a tree, such as might be deemed suitable for some purpose, as a gardener pulls up a turnip, a carrot, or an onion, or cuts a cabbage or a cauliflower, which may be better than the others, and leaves those others to grow till they too may be fit for use in any way in which they might be required, a method which may be suitable for adoption in a bed of vegetables, but which our experience of centuries has proved disastrous to a forest. It is more than two hundred years since it was superseded as a general method of exploiting forests in France by what was called *La Methode à Tire et Aire*, widely diffused by the issue

of the famous Forest Ordinance of 1669, not only throughout France but throughout Europe, which—as did the founding of Rome, the birth of Christ, and the flight of Mahomet, marked the commencement of a new era, doing so in so far as the management of forests is concerned; and *Jardinage*, excepting in so far as it offers some advantages in its application to certain exceptionally situated forests, has been abandoned, or is being superseded, in every country on the Continent of Europe, by another mode of exploitation founded on modern forest science, which is the method of exploitation followed now in the Colony, under the new regime.

In this also the forest is divided into a number of sections corresponding to the time required for the reproduction of the trees. But instead of exploitation being confined to one of these at a time, the supply of wood required is obtained from the felling of the trees in one or more lots, and from first, second, and third thinnings in others—all being so arranged as to secure simultaneously, and without prejudice to one or other of them, an improved condition of the forest, a sustained supply of products, and a natural reproduction of the felled forests by self-sown seed. All these results are now being obtained by this method of exploitation. It may seem to be the *ne plus ultra* of forest management, and is in advance of that which Dr White had in view in the suggestion made by him, and adopted by the Legislative Assembly, for submission to the Governor of the Colony.

Nor was it only that the mode of exploitation was objectionable, but cheating, stealing, and pilfering, were practised extensively, and concessions of trees, in such quantities as might be required for public works, were made from time to time, which concessions, if not abused, were at times so used as to increase greatly the waste of forest products.

And in the preface to a pamphlet published by Dr Pappe, entitled: *Silva Capensis:* or a description of South African forest trees and arborescent shrubs, used for technical and economical purposes by the Colonists at the Cape of Good Hope, published in 1854, as an accompaniment to a collection of South African indigenous woods, transmitted by the Govern-

ment to the Paris Universal Exhibition of 1855, he says:—'In several parts of this essay the reader will find observations on the wanton usage annually exercised in the Colony of setting fire to the mountains and bushes, an injurious practice, which in one sweep destroys a vast quantity of the most valuable timber and useful woods. When, twenty-four years ago, I arrived in the Colony, *Protea Coccinea*, R. Br., one of the handsomest of the Proteacean tribe, adorned the slopes of the Devil's-head Mountain. Since that period this beautiful shrub has gradually disappeared, and seems now to have been altogether annihilated. It is well known besides that wooded ravines and forests increase the moisture, and produce springs and running streams, the scarcity of which is but too often felt in this dry country. That the legislature of our day has not yet enacted sound and stringent laws against the repetition of an outrage of such magnitude, is a matter of deep regret and just astonishment.'

In 1858 there was created at the Cape the Office of Colonial Botanist, with the two-fold object—(1st), Of ascertaining and making generally known the economic resources of the Colony, as regards its indigenous vegetable productions, and its fitness for the growth of valuable exotic trees, and other plants; and (2nd), Of perfecting our knowledge of the flora of South Africa, and thus contributing to the advance of botanical science. The appointment was given to Dr Pappe, and held by him till his death in 1862.

In the following year, 1859, there was passed a stringent law anent the practice of burning the veldt with another, or provision in the same, for imposing prudential restrictions on the careless use of fire, in smoking, and in cooking provisions in the open field. And in the same year, or about the same time, was passed an equally stringent law anent forest depredations.

These laws which I have seen were such as might have been applied with great advantage to the Colony to reduce or prevent two of the evils referred to. But according to the credible testimony of men in various positions in life, whom I met with in different parts of the Colony, they were, when I

was there, and had been long, to a great extent a dead letter; and the evils they were designed to check continued in operation in many of the forest districts, and probably did so in all.

In the preface to a second revised and enlarged edition of the pamphlet by Dr Pappe, which was published in 1860 as an accompaniment to a second collection of South African woods, which he had hoped would be sent to the International Exhibition in London, but which, in consequence of the Colony not being represented there, were, by the decision of the Government, presented to the Museum of the Royal Gardens of Kew, he again adverts to the subject, and says :—'In several passages of this little work the reader will meet with observations on the wanton usage annually exercised in this country, of setting fire to the mountains and bushes—an injurious practice, which in one sweep destroys large quantities of valuable timber and useful woods. The most awful consequences must necessarily attend such outrageous conduct, it being universally admitted that forests and woods attract and increase moisture, produce rain, and give rise to springs and running streams, while tracts deprived of vegetation become heated, barren, and dry.'

And in his report as Colonial Botanist for 1862, he returns to the subject :—'During my journeys through many of the interior districts, and particularly those of the west, I was struck with the wanton destruction of the vegetation by fire. On my return to the Cape from Mossel Bay, two years ago, I found the entire formerly well-wooded mountain range of the Swellendam and Caledon divisions in a blaze; and these conflagrations are, I fear, annually repeated. The most awful consequences must necessarily attend such outrageous conduct, and I ascribe the excessive drought, with which these districts have been visited of late, in no small measure to the annihilation of the bushes and trees in the ravines of these mountains. . . . . Meanwhile the indigenous forests of the Knysna and Plettenberg Bay—the Zitzikamma, Olifantshoek, Zuurberg, Kat River, British Kaffraria, &c., are able to yield vast quantities of valuable timber, from which, if

economised, the whole Colony would reap the benefit, while under the present mode of administration neither the Government nor the community derive those advantages from them which they ought to produce.

'Amongst the most common and striking instances of injury done to the woods that fell under my own observation may be ranked the wanton and indiscriminate felling of trees at all seasons, and the carelessness with which useful and sound cut timber is frequently left to rot in the forests.'

In 1861, in view of the importance of having the Cape woods represented at the International Exhibition to be held that year in London, Dr. Pappe made a tour through a great portion of the Eastern Province, and on his return reported to the Government:—

'My visits paid to the different forests have convinced me of the necessity there exists for their better administration and tutorage. Rich, and in most cases extending over large areas, these woodlands have hitherto been but a poor source of public revenue, while they abound in timber and a variety of excellent woods for agricultural, technical, and many other purposes.'

And in a subsequent report he says:—'Impressed with the belief that the Cape of Good Hope would be represented at the great International Exhibition now open in London, and moved by the appointment of Government Committees for collecting the products of the Cape, I proceeded, towards the end of February, 1861, to the Eastern Province, not merely to collect, but to make myself generally and personally acquainted with the many natural resources which these fine and fertile regions afford.

'Amongst these, the extensive and hitherto but little appreciated primitive forests with which that part of the country abounds, attracted my special attention. I therefore visited many of them, and by procuring specimens of woods from each, succeeded in bringing together the most complete and valuable collection of South African woods ever yet made.

'This collection, all the specimens of which are handsomely prepared, and properly named, comprises a series of about seventy different kinds, and many of these will be found

serviceable, either as timber, or as yielding suitable material for ornamental and common furniture, veneering, the construction of bridges and mills, railway purposes, turnery, waggon making, the manufacture of rural utensils, tools, musical instruments, carving, wood-engraving, &c.

'Besides this collection, originally intended for the great International Show, and which it would be desirable now to present to the Royal Museum of Economic Botany at Kew, four similar sets of smaller size have been prepared for the Musea and Colleges of Capetown, Port Elizabeth, Albany, and Graaff-Reinet, respectively. The contemporaneous publication of a pamphlet, now [1862] in the printer's hands, containing descriptions, and much available information, will, I trust, tend to enhance the usefulness of the collections.*

There follow statements relating to the destruction of forests by fire which he had seen in the course of his journey, and the desiccation of soil and climate which he anticipated would follow; and he proceeds:—

'A law intended to check bush-burning has, it is true, been lately proclaimed, but its provisions seem far too lenient for the successful suppression of an act, which in its nature differs little from, and partakes a great deal of, the crime of arson. I have heard it asserted that many difficulties obstruct the efficiency of the decree, but I believe that if rewards were

* These specimens have been preserved in the Museum of Kew Gardens, and planed and varnished specimens of most of the woods sent to the British Museum, while specimens of the foliage, flowers, and fruits of most South African plants, inclusive of those there represented, collected by Dr Pappe and others, arranged by Dr Harvey, then Professor of Botany in the University of Dublin, are preserved in Trinity College, Dublin, and in the Museum, Capetown. The specimens sent to the Exhibition were accompanied by an account of the botanical characteristics, general appearance, and economical application of each, afterwards published in the pamphlet entitled: *Silva Capensis*, or a description of South African forest trees and arborescent shrubs, used for technical and economical purposes. London: Ward & Co., 27 Paternoster Row; Capetown: W. Brittain. More explicit information in regard to some of them is given in *Flora Capensis*, by Drs Harvey and Sanders, of which three volumes have been published, including the Thalamifloræ, and most of the Calyciflorae Exogen.—J. C. B, Dublin: Hedges, Smith, & Co.; Capetown: J. C. Juta.

offered to persons able and willing to denounce and convict the perpetrators of such offences, the latter would be discovered with ease, and brought to deserved punishment.

'I thought it my duty to dwell on this matter as a very serious one, since in a country poor in rivers, and exposed in summer to the scorching rays of an African sun, the supply of water should be increased and husbanded by all possible means. An encouragement of arboriculture, the construction of tanks and dams, the conservation of forests, and a judicious system of irrigation, would doubtless be crowned with the most happy effect.

'But it is also for the sake of rural economy, and as a source of future revenue, that I wish to invite the attention of the Legislature to the existing defective and unsatisfactory management of the Crown forests. The requirements for the supply of wood for great public works become more urgent every year, and the Colony has to import what she may procure within her own limits. In saying so much, I allude more especially to the establishment of railroads and telegraphs, which cause an enormous demand for timber all over the civilised world, and by which the forests of most countries become thinned to a considerable extent. Meanwhile the indigenous forests of the Knysna and Plettenberg Bay—the Zitzikamma, Olifantshoek, Zuurberg, Kat River, British Kaffraria, &c., are able to yield vast quantities of useful material, from which, if economised, the whole Colony would reap the benefit, while under the present mode of administration neither the Government nor the community derive those advantages from them which they ought to produce

'Amongst the most common and striking instances of injuries done to the woods, that fell under my own observation, may be ranked the wanton and indiscriminate felling of trees, at all seasons, and the carelessness with which useful and sound cut timber is frequently left to rot in the forests. A simple code of forest regulations, strictly enforced, would have the effect of preventing this waste, and the slovenly felling of trees.

'In order to prevent exhaustion, and for the purpose of

securing a constant supply of timber, the introduction of planting operations would be productive of undoubted advantages for the future, this system of forestry being now almost universally adopted. By such means, whole forests of stinkwood, yellowwood, sneeze and assegai woods, &c., might be brought into being, and I ought to remark that Captain Harrison, the able and zealous Conservator of the Uitenhage forests, had actually tried the experiment with decided effect, when one of those conflagrations of which I have spoken, and which are of such frequent occurrence, destroyed the whole of his youthful thriving plantations.'

On the death of Dr Pappe I was invited to the Colony to prosecute the researches in which he had been engaged. On receiving the appointment I made, as has been already stated [*ante* p. 2], arrangements to visit the forest districts of the Colony; and on my return to Capetown I submitted to the Government a memoir On the conservation and extension of the forests as a means of counteracting disastrous consequences following the destruction of bush and herbage by fire, of which the following is a copy:—

'The disastrous consequence to which I refer more especially is the diminished supply of moisture which follows the burning of the veldt.

'I have found everywhere, in the course of my tour, in the physical geography of the country, what seemed to me indications that at a period not very remote this must have been a land well watered everywhere; and I have also found that within the memory of the present occupants of the land there has been a remarkable change in the aridity both of limited and of extensive districts. I have satisfied myself that this is not a mere fancy, to be classed with the common saying in ancient and modern times, that the former days were better than these. The fact is well attested, and I can refer to places both in the Eastern and the Western Provinces, where the change was observed to follow immediately the destruction of bush, which is only in accordance with what I would have expected.

'There is a wide-spread opinion that forests attract rain. I

shall afterwards have occasion to give a different account of the fact upon which this opinion rests. At present I rest satisfied with stating that what is done by forests on a large scale is done on a smaller scale by the bush, herbage, and grass of the veldt. If they do not attract rain, they at least retain moisture; and the destruction of them allows that moisture to be carried off.

'It is well known that if a wet cloth be exposed to the air it soon becomes dry, or if a quantity of water be left exposed in a basin it soon disappears if the air be hot and dry; even the large reservoir of water, if not replenished, dries up in the course of time. In all of these cases the water passes off in a state of vapour. This vapour is transparent; it is not like the cloud or mist, which consists of water in minute drops suspended in the air. It is in a state of gas, and is as invisible as the air itself. In accordance with the law of gaseous diffusion, which admits of an unlimited diffusion of one gas through another, the atmosphere is permeated with this vapour, which may be found everywhere, on the summit of the highest hills and at the bottom of the deepest mines alike. It may have been observed that a glass of iced water is immediately covered on the outside with dew drops of moisture. Whence come these? Not through the glass from the water within, but from the atmosphere without —a proof that the moisture was there, though unseen.

'But while moisture may be found in the atmosphere everywhere, it is not always present in the same quantity in the same space. In almost any circumstances, but more especially where there is an unlimited supply of moisture, the quantity varies with the temperature, and varies with the temperature to a very great degree. According to Sir John Leslie, it doubles with every rise of twenty-seven degrees of temperature; and, according to subsequent observers, it varies to a still greater extent, the doubling taking place at different intervals, which increase slowly with the temperature—the mean being 23° 4′ from the freezing point to 100° Fahrenheit.

'According to Leslie's calculation, the air at a temperature of 59° or 60° will hold twice as much as at 32°, or the freezing

point; and at 86° it will hold twice as much again. And, according to later observers, at 121° it will hold twice as much again, or sixteen times as much as at 32°, eight times as much as at 53°, or four times as much as at 75°.

'It is customary to speak of this as the solvent power of the atmosphere, as if the moisture were dissolved in the air as sugar may be dissolved in water; but it is more in accordance with fact to consider that as water requires a certain amount of heat to keep it from passing into a state of ice, so it requires a certain amount of heat to keep it in a state of vapour and prevent it from passing into a state of water.

'In accordance with this, it happens that if air of a higher temperature, having as much moisture in it as can be sustained in a state of vapour, be cooled down some degrees, a quantity of moisture, which can no longer be maintained in a state of vapour, will assume the form of water in minute drops, and appear as fog, or cloud, or mist; but let the temperature be again raised to the same elevation as before, and this water will again assume the state of vapour, and the air become transparent, the fog or cloud having melted away. In illustration of this fact, I may refer to what is seen in the laying of the cloth on Table Mountain when the south-east wind blows. The temperature on the top of Table Mountain is lower than that of the wind blowing over its summit, and the mountain cooling down the air a quantity of the vapour intermixed with it is deposited in the form of a cloud, which is blown over the face of the mountain, and falls, threatening to bury the city below. But before it can reach Capetown it must pass through an intermediate stratum of air of a higher temperature than that to which it has been reduced; by this it has its temperature again raised, and the cloud evaporates and disappears, followed by a continuous mass of cloud, which on reaching the same level vanishes into thin air leaving no trace behind.

'It may have been observed that the hotter an iron plate may be the more quickly is any water spilt upon it converted into vapour. The reason is the more rapidly does it impart the heat necessary to the vaporization of the fluid. So is it with the soil; the hotter the soil may be the more rapidly is moisture evaporated.

'There is always a difference in the temperature of soil exposed to the direct rays of the sun and the temperature of soil in the shade—whether that shade be afforded by roof, rock, tree, or bush, or even by the grass. If the difference be only 25°, the mean of the two numbers given as the measurement of the geometrical ratio of temperature at which the quantity of moisture in the atmosphere doubles, it may be reckoned that not more than one half of the moisture which would have been taken up every minute during the day, if the soil had been unshaded and the supply of moisture sufficient, will be taken up in the shade. I have used a guarded expression, because the exact difference will vary with the nature of the soil, with the elevation of the temperature, and with the quantity of moisture in the ground. This can be determined by experiment. The general principle alone is explicitly affirmed.

'Thus can we in part account for what has been seen to follow the destruction of bush, whether it be for a supply of fuel, or in connection with the burning of the veldt, as a means of securing pasturage desired for flocks or herds. The principle evolved is equally applicable to the destruction of trees. But the burning of the veldt operates injuriously, not only by occasioning a temporary exposure of the soil to the evaporating influence of unmitigated heat, but also by permanently destroying both seeds and roots of plants, which at once shade the soil, and supply a pasturage which is in some cases scarcely less valuable, and in some perhaps more so, than the pasturage for the sake of which this is done; and, therefore, is it that I have only spoken of accounting in part for the evil.

'It may be that in some cases the burning of the veldt has been followed immediately by copious rain. Such rains have been observed in connection with the eruption of a volcano, the conflagration of a city, and the discharge of musketry and artillery on a field of battle or a review. And it can be accounted for thus: By the heat evolved the air is rarified and ascends; air rushes in to fill the vaccum, and follows in the wake of what has gone on before; the air reaching an elevation at which the temperature is much less, the moisture is kept no

longer in a state of vapour, but a cloud is formed; and if the circumstances be favourable, rain falls. But while cloud or rain may be observed to follow immediately the burning of the bush within a very short period, a few weeks it may be, it may also be found that streamlets flowing from the place have been dried up in whole or in part.

'At the Kowie, between Belford and Adelaide, I met with what seemed a contrary effect produced by the burning of the trees in one of the kloofs. There I was told that from the time this happened there had been a more copious flow of water in the stream than before. But on subsequent inquiry I found that at parts of the same valley, which were not likely to be effected by the denudation of the kloof in question, there had also been a more copious supply of water—an indication that the coincidence was accidental, and that the increased flow of water must have arisen from some other cause. That the denudation of a country has been followed by increased heat and moisture seems to be established beyond question.

'"Almost everywhere," says Schleiden, Professor of Botany in the University of Jena, "in the great characters in which nature writes her chronicles, in fossilized woods, layers of peat, and the like, or even in the little notes of men, for instance, in the records of the Old Testament, occur proof, or at least indications that those countries which are now treeless and arid deserts, part of Egypt, Syria, Persia, and so forth, were formerly thickly wooded, traversed by streams now dried up or shrunk within narrow bounds; while now the burning glow of the sun, and, particularly, the want of water, allow but a sparse population. In contrast, must not a jovial toper laugh indeed, who looks from Johannisberg out over the Rhine country, and drinks a health in Rüdesheimer to the noblest of the German rivers, if he recall the statement of Tacitus, that not even a cherry, much less a grape, would ripen on the Rhine! And if we ask the cause of this mighty change, we are directed to the disappearance of the forests. With the careless destruction of the growth of trees, man interferes to alter greatly the natural conditions of the country. We can, indeed,

now raise one of the finest vines upon the Rhine, where two thousand years ago no cherry ripened; but, on the other hand, those lands where the dense population of the Jews was nourished by a fruitful culture are in the present day half deserts. The cultivation of clover, requiring a moist atmosphere, has passed from Greece to Italy, from thence to Southern Germany, and already is beginning to fly from the continually drier summers there, to be confined to the moister north. Rivers which formerly scattered their blessings with equal fulness throughout the whole year, now leave the dry and thirsty bed to split and gape in summer, while in spring they suddenly pour out the masses of snow accumulated in winter over the dwelling-places of affrighted men. If the continued clearing and destruction of forests is at first followed by greater warmth, more southern climate, and more luxuriant thriving of the more delicate plants, yet it draws close behind this desirable condition another which restrains the habitability of a region within as narrow, and perhaps even narrower limits, than before. In Egypt, no Pythagoras need now forbid his scholars to live upon the beans; long has that land been incapable of producing them. The wine of Mendes and Mareotis, which inspired the guests of Cleopatra,—which was celebrated even by Horace,—it grow no more. No assassin now finds the holy pine-grove of Poseidon, in which to hide and lie in ambush for the singers hastening to the feast. The pine has long since retired from the invading desert climate to the heights of the Arcadian Mountains. Where are the pastures now, where are the fields around the holy citadel of Dardanus, which at the foot of the richly-watered Ida supported three thousand mares? Who can talk now of the "Xanthus," with its hurrying waters? Who would understand now the "Argos feeder of horses?"

'And so it has been elsewhere. In Barbadoes and Jamaica the felling of forests has been attended by a diminution of rain. And in South Africa Moffat relates that on his settlement at Latakoo "the natives were wont to tell of the floods of ancient times, the incessant showers which clothed the very rocks with verdure, and the great giant trees which once

studded the brows of the Hamhana hills, and neighbouring plains. They boasted of the Kuruman and other rivers with their impassable torrents, in which the hippopotami played, while the lowing herds walked to their necks in grass, filling their *makik makukas* (milk sacks) with milk."

'Mr Moffat found no difficulty in accounting for this. "The Bechuanas, especially the Batlapis and the neighbouring tribes," says he, "are a nation of levellers; not reducing hills to comparative plains, for the sake of building their towns, but cutting down every species of timber, without regard to scenery or economy. Houses are chiefly composed of small timber, and their fences of branches and shrubs. Thus, when they fix on a site for a town, their first consideration is to be as near a thicket as possible. The whole is presently levelled, leaving only a few trees, one in each great man's fold, to afford shelter from the heat, and under which the men work and recline.

'"The ground to be occupied for cultivation is the next object of attention. The large trees being too hard for their iron axes, they burn them down by keeping up a fire at the root. These supply them with branches for fences, while the sparrows, so destructive to their grain, are thus deprived of an asylum. These fences, as well as those in towns, require constant repairs, and indeed the former must be renewed every year; and by this means the country for many miles becomes entirely cleared of timber; while in the more sequestered spots, where they have their outposts, the same work of destruction goes on. Thus, of whole forests, where the giraffe and elephant were wont to seek their daily food, nothing remains.

'"When the natives remove from that district, which may be after only a few years, the minor species of the acacia soon grows, but the *acacia giraffe* requires an age to become a tree, and many ages must pass before they attain the dimensions of their predecessors. In the course of my journeys I have met with trunks of enormous size, which, if the time were calculated necessary for their growth, as well as their decay, one might be led to conclude that they sprung up immediately after the Flood, if not before it. The natives have also the yearly

custom of burning the dry grass, which on some occasions destroys shrubs and trees even on the very summit of the mountains. To this system of extermination may be attributed the long succession of dry seasons. To the same cause may be traced the diminution of fountains, and the entire failure of some which formerly afforded a copious supply, such as Griqua Town, Campbell, and a great number of others which might be mentioned. It has been remarked that since the accidental destruction of whole plains of the *Olea similis* (wild olive) by fire, near Griqua Town, as well as the diminishing of large shrubs on the neighbouring heights, a gradual decrease of rain has succeeded in that region."

'That the heathen in their ignorance should have acted as described need not surprise us; but what better has been the course pursued by the more civilized? Is it not the case that the history of civilized man in his colonization of new countries has been in every age substantially this—he has found the country a wilderness; he has cut down trees, and he has left it a desert?

'In view of this, Schleiden, to whom I have already referred, writes, if not in the words, yet following the train of thought of one of the noblest veterans of our science, the venerable Elias Fries, of Lund:—

'"A broad band of waste land follows gradually in the steps of cultivation. If it expands, its centre and cradle dies, and on the outer borders only do we find green shoots. But it is not impossible, it is only difficult, for man, without renouncing the advantage of culture itself, one day to make reparation for the injury which he has inflicted, he is appointed lord of creation. True it is that thorns and thistles, ill-favoured and poisonous plants, well named by botanists, 'rubbish plants,' mark the track which man has proudly traversed through the earth. Before him lay original nature in her wild but sublime beauty. Behind him he leaves the desert, a deformed and ruined land; for childish desire of destruction, or thoughtless squandering of vegetable treasures, have destroyed the character of nature; and man himself flies terrified from the arena of his actions, leaving the impoverished earth to barbarous races or animals,

so long as yet another spot in virgin beauty smiles before him. Here again, in selfish pursuit of profit, consciously or unconsciously, he begins anew the work of destruction. Thus did cultivation, driven out, leave the East, and the deserts perhaps previously robbed of their coverings; like the wild hordes of old over beautiful Greece thus rolls this conquest with fearful rapidity from east to west through America, and the planter often now leaves the already exhausted land, the eastern climate becoming infertile through the demolition of the forests, to introduce a similar revolution into the far west.

"'But we see, too, that the nobler races, or truly cultivated men even now raise their warning voices, put their small hand to the mighty work of restoring to nature her strength and fulness in yet a higher stage than that of wild nature; one dependent on the law of purpose given by man, arranged according to plans which are copied from the development of manhood itself. All this, indeed, remains at present but a powerless, and for the whole, an insignificantly small enterprise, but it preserves the faith in the vocation of man and his power to fulfil it. In future times he will and must, when he rules, leads, and protects the whole, free nature from the tyrannous slavery to which he now abases her, and in which he can only keep her by restless giant struggles against the eternally resisting. We see in the grey cloudy distance of the future, a realm of peace and beauty on the earth and in nature but to reach it must man long study in the school of nature, and, before all, free himself from the bonds of that exclusive selfishness by which he is actuated."

'To this work I would urge. It may be unusual to insert in a professional report lengthened quotations from published works. An intense desire to carry home conviction must plead my excuse for the course I have followed.

'Even with such help I must fail, I fear, to convey an adequate conception of my deep conviction of the disastrous consequences following the destruction of bush and herbage by the prevalent custom of burning the veldt; but I have thus shown that I do not stand alone in my opinion that increased heat and drought follow all such destruction of vegetation;

and I may thus secure more careful attention to my remarks on the conservation and extension of the forests as a means of counteracting the evil referred to.

'I attach more importance to the extension of the forests, than I do to the conservation of them, as a means of securing a moister climate for the Colony, but I do not consider the latter unimportant. And what I submit for consideration at present is (1), the possibility of preventing the destruction of forests by fire; (2), the possibility of diminishing the waste which at present accompanies the procuring from the forest a supply of timber; and (3), the expediency of applying the small amount of revenue which is derived from the forest in the extension of these in other districts.

'I. In regard to the destruction of forests by fire, I have been told in forest districts that from the abundance of herbage and green wood in the forests it is impossible they can be destroyed by fire; and in support of the allegation my attention has been called to the remains of aged trees which occupied positions from which it was necessary to remove them, but which from the state of decay in which they were could not be cut up as timber, and which were set on fire and burned standing, without setting fire to the trees surrounding them in actual contact.

'But again I have been told of encroachments made on the forests thus:—The veldt has been burned—the flames have come up to the verge of a forest, and there been stopped, but not until they had scorched and killed a narrow stripe or belt of brushwood or trees.

'The veldt was burned again another season, and the brushwood and trees previously scorched and killed fell victims to the flames, and in burning scorched and killed a broader belt, which in a subsequent year met a similar fate with similar effects.

'And I have seen mountain sides, now naked and bare, which some years ago were covered with trees, all of which has been destroyed by fire.

'With a view to the prevention of such occurrences, it seems

to be desirable that intelligent agriculturists should be encouraged seriously to enquire into the profit or loss to themselves of a practice so injurious to the country. And should they be led to conclude, as I anticipate they will, that, all things considered, the burning of the veldt is productive to them of more loss than gain, an enlightened public opinion may be brought to bear with happy effect upon the ignorant and uninformed.

'II. With regard to the waste which at present accompanies the procuring from the forests of a supply of timber, there exists everywhere an idea that it is very great. I gave attention to the subject in the different forests which I visited, and I found that the opinion was not altogether without foundation. I have not the means of determining by a comparison of what takes place in these forests with what takes place in timber forests in other lands, whether the waste here is relatively great; but I have seen that the actual waste is considerable. Not only does the fall of one tree necessarily occasion the destruction of saplings growing around it, but noble yellow-wood trees are cut down to furnish beams twenty feet in length, and all the tree, excepting a log of that length, is left to cumber the forest and to decay. I saw the remains of one such tree, which had measured thirty-five feet from where it was cut to the first branch. Five feet of timber was cut from the one end of the trunk and nine feet from the other. And these remnants, which might have been employed in the formation of naves for waggons, or in other ways, were, with all the boughs and branches, left to rot. On appealing to an experienced wood-cutter, who had accompanied me, he referred me to the terms of the license granted. On my asking if he would follow the same course if the forest were his own, he answered, with a significant smile, "That's another matter!" and added that in that case he would follow another course altogether. This tree was apparently a fair specimen of the trees generally cut down for beams. I was told of another tree which was cut down. It was found to measure three feet six inches in diameter: but twelve-inch beams only were required, and no other appliances than the axe and the adze being at command, it was cut to the required length, and chips were

cut off the one side and the other till it was reduced to a slab twelve inches thick; and this was sent to a saw-mill to be cut in such breadths as might be desired.

'A similar course, I have been told, was at one time followed in Russia; but the Government of that country, though the forests there seem to be interminable, found it necessary for the good of the country strictly to prohibit such waste.

'I saw also considerable waste, perhaps unavoidable, in the cutting of timber for railway sleepers. Not only is timber which might be employed advantageously in the manufacture of furniture employed for this purpose, but the purchasers, perhaps properly, refusing to take over any sleepers in which there is a flaw, I found that much timber, after it was cut, was left to perish, and of trees employed, a portion only was cut out and a large portion was left to rot.

'I blame not the wood-cutters for the waste to which I refer. In all the cases I have mentioned the waste entailed upon them a great amount of labour, which they would have gladly avoided.

'Nor do I blame others. My sole desire is to direct attention to the importance of getting the refuse wood turned to profitable account, and to submit one plan, that which seems to me to be the best for effecting this.

'It may be that the supply of timber in our forests is very great; but I am not aware that this has been ascertained. It is certainly not inexhaustible, and much of it grows in places which are altogether inaccessible. Moreover, many of the trees cut down show by the number of concentric rings in their trunk that they are probably the growth of several centuries; and such trees cannot be replaced. It may be the case that their timber is now required in the lengths in which it is furnished by the wood-cutters; but if the tree must be cut down to furnish this, all these considerations make manifest the importance of an economical use of what remains

'This can only be secured by making it remunerative to parties to work up the waste timber; and this I think might be accomplished, if, without expense to the community, or detriment to their interests, sufficient encouragement could

be given to private parties to erect saw-mills in the immediate vicinity of the forest.

'In some chemical manufactories the profit is found, not in the manufacture of the article for the manufacture of which the manufactory has been erected, but from the profitable recovery of material in the waste waters. And so I anticipate it would be with such mills. The profit would be found in turning to account every portion of the tree cut down for timber.

'With steam or water power at command, much that is elsewhere performed by manual labour could be done; and thus might every part of the timber required in house-building, in waggon-building and in the manufacture of furniture be furnished ready for the hand of the artificer, while there would be effected a great saving in the expense of transport by this being reduced to that of the conveyance to a distant part of only what is there required. At the same time, out of the *débris* slabs for paling could be cut, as is done at the Victoria Saw-Mills, in Kaffraria; and, if satisfactory arrangements could be made for transport, firewood might be supplied from the smaller fragments, if these were not required as fuel on the spot.

'To warrant the erection of such a mill it would be necessary for the parties interested to secure for a difinite period of considerable duration the exclusive privilege of cutting timber in a well-defined locality of considerable extent. And the only encouragement I contemplate is the granting of this exclusive privilege on terms satisfactory to all concerned, satisfactory to them and remunerative to the community for what is cut down or otherwise destroyed.

'The district would require to be of considerable extent, otherwise the contractors would not be warranted in going to the expense of erecting a mill. Their gains would depend entirely upon the extent of their sales. There are certain expenses which would be nearly the same whether the business transactions were great or small. Thus would it be with the interest on the money invested in the undertaking, and with the remuneration due to them for superintendence, reckoned at the salary or salaries they would have to pay to another or

others equally qualified with themselves to superintend the work, or by the salary or salaries they would themselves receive if employed by others. And thus, also, would it be within a limited range with the sinking fund set apart to meet the tear and wear of buildings and machinery, and with the expenditure in wages for labour within the mill, including the hire of an intelligent foreman or of a machinist. Unless the sales supplied a profit sufficient to cover all these expenses, the work must be carried on at a loss; and such sales can only be secured by extensive operations.

'The contract would require to embrace a lengthened period, otherwise the contractors could not undertake the systematic construction of necessary "shoots," along which the timber might travel, carried onward by its own momentum, and of *slid-pads* along which it might be dragged to these from the interior of the forest.

'And the privilege of cutting timber in the district would require to be limited to them, and those whom they might permit or employ; otherwise other wood-cutters would be tempted surreptitiously to avail themselves of their *slid-pads* and "shoots," damaging them, it may be, in their reckless haste to escape observation, and taking advantage of the outlay of the contractors to compete with them on unequal terms in the market.

'From such exclusive privileges there would result at the same time another advantage. It is alleged that at present there is a considerable quantity of wood removed from the forests over and above what the licenses granted would indicate. I satisfied myself that this allegation is not without foundation. The remedy for this would seem to be a closer surveillance; but a perfect surveillance by the limited number of rangers now employed is said to be impossible. Under such a contract as I have supposed the surveillance of the district specified might be safely left in the hands of the contractors if they would consent to undertake the labour, and if proper facilities for bringing trespassers to justice were afforded to them.

'It may be objected that the effect of such exclusive privileges would be to give such parties a monopoly of the field, or a monopoly of the market, to the detriment of labourers already in the field, and ultimately to the detriment of the community. Such are not my views of what is likely to follow.

'Such a contract would not give the contractors a monopoly of the field in any other sense than licenses granted for the cutting of timber in the forests of George, Knysna, Zitzikamma, or Olifants's Hoek, may be considered to give a monopoly of the forests for which it is held against the holders of licenses for cutting timber in other forests. It would only be carrying out a little further the principle already adopted, and the extent of the forests makes it very improbable that any one forest would at present be let or sold exclusively to one party.

'Neither would such a contract give them a monopoly of the market. In all country towns we find open to all the morning market, in which everything is sold by auction, and such contracts as are supposed can secure, if it be found desirable, that portions of forests in immediate proximity to a market town be reserved for supplying timber, cut in accordance with licenses, such as are at present issued.

'But even if the effect were to be virtually and actually to give the contractor a monopoly of the field, I question whether this would really be to the detriment of the labourers now at work. At present, holders of licenses, in some cases at least, hire labour. And I have been assured that timber is sold by them on the public market at less than the nominal wages paid by them for the cutting of it into beams by the sawyers at the pit. I have made inquiry into the arrangement or arrangements whereby this can be done with at least an appearance of profit; and I do not write in ignorance of these when I allege that it would be better for all concerned—license-holder, labourer, and store-keeper alike—that the hired labourers were employed on fair wages by parties having command of capital. While the magnitude of operations by which alone such parties could make their enterprise profitable would require them to employ men of superior energy, such as are the license-holders; and these

they would probably employ at wages superior, it may be, to the gains they at present make, and to make which they must lead a toilsome life, which few would envy.

'Neither would it be to the detriment of the community if the command of capital possessed by such contractors should lead them so to conduct their business, intentionally or unintentionally, as to withdraw or to drive from the market such parties as now hold licenses to cut timber. The low price at which foreign timber can be procured would prevent the rise of prices beyond a certain point, and thus the interests of the community would be protected.

'It may be, indeed, that notwithstanding this, the price of timber would advance somewhat beyond what is at present paid. But I see little probability of prices rising above a fair remuneration to the producer of the cost of production; and it can be no benefit to a community to have the produce of their own forests, cut down by members of their own community, sold for less than this; and this will be reduced considerably below what it is at present.

'It should be borne in mind that the cost to the timber-cutter of the production of timber is not to be reckoned by the wages paid by him to the labourer alone. His own superintendence of the work of his hired labourers has a money value. Besides this, there is the tear and wear of implements, of waggons, and of cattle. I have gone up *slid-pads*, and seen what often occurs in these. A tree is cut down, a path to the nearest road must be cleared; the distance may be a quarter of a mile, but this is done, and by oxen the trunk of the tree is dragged along and afterwards conveyed to the saw-pit. All the expense which is thus incurred before the trunk can be cut up by the sawyers is part of the cost of the production of the timber thence obtained; and this also must be added to the wages paid to those who felled the tree, and to those by whom it was afterwards cut up.

'But this is not all. A second party, and it may be a third, seeing that the *slid-pad* is made, forthwith look out for trees near to it, which may be cut down by them and conveyed to the saw pit without putting them to the trouble and expense

of cutting a new *slid-pad;* and the *slid-pad* is by-and-by the scene of continuous traffic. By this the path is cut up. Here and there roots running across it are laid bare. Every log which is brought down strikes against these with violence, and the shock is most injurious to the oxen of the team. At length, at a turn in the path, there is one root completely exposed, and it seems impossible that another log can be brought down without a risk of killing or maiming one or more of the oxen. But who is to remove it? One party says to himself, "There is a risk; but if I can only get down this log, So-and-so must remove it before he can possibly get down another, and I shall afterwards share the benefit. I'll risk it!" He does so. And So-and-so says and does the same. And the third party does likewise. And the result may be that one or two oxen are maimed, and one perhaps is killed; and the loss thus incurred must be added to the cost to the owner of the oxen of the production of all the timber obtained by him by that *slid-pad* thus raising the average cost of the production of all. Thus it is at present.

'By lessees of the district such *slid-pads* would be systematically arranged, and put and kept in order at much less expense, and thus the cost of production of timber would be lessened. I have been told that provision has been made for determining by proper authority what trees shall be cut down; and it may be concluded that this must limit the possibility of such occurrences as those to which I have referred. But I am told that in British Kaffraria, "to any one who can pay the amount (fifty shillings per quarter) a license is granted with permission to fell and saw timber, just when, where, and how he pleases, no kind of supervision being exercised over him. The result is, that such men proceed to the likliest part of the forest, and cut out only the youngest trees, and such as will give the least amount of trouble to procure and saw." And I am told that within the Colony, where the form of license granted is altogether different, it is virtually the same.' "The timber thus obtained,' says my informant, "is invariably destined for the public markets, where none but 20 feet lengths of 1 × 12 planks and 3 × 4 quarterings, are saleable; hence a considerable waste in

pieces less than twenty feet long or three inches thick left to perish." Where this is wrought up at a saw-mill the cost of production of the timber for which the tree is cut down is proportionately reduced, and in whatever way the proprietors of mills may distribute their profits over their sales, they can afford at least to sell the timber at a corresponding reduction of price.

'But thus is brought up another question—the sacrifice, if not the cost, to the community, at which timber is at present supplied. I speak not of the cost of the production of the tree yielding the timber, or the cost at which it could be replaced exactly as it is. I speak only of the sacrifice, or cost of production of the timber obtained from it. There is, first, the tree itself, its roots and its branches all sacrificed that a portion of its trunk, twenty feet long, may be obtained as timber; and to this must be added the sacrifice of all saplings crushed by its fall, or cut down, or burned down to make way for its removal. It may be extreme cases only which have been reported to me or brought under my notice, but I have been told of the whole of the saplings on a hill-side being burnt that the trunk of a tree, felled upon the summit, might be rolled down; so that timber worth a few shillings has been obtained at a sacrifice to the community of, say, five hundred saplings at sixpence each, or *twelve pounds ten shillings*, in addition to the value of the tree itself. Thus may be reckoned the cost to the community of the timber obtained. That tree as a tree, was worth more to the community than the price obtained for the timber. No amount of money could replace it in less than a hundred years! It is gone, and regret is now unavailing; but it may be noted it has been sacrificed to furnish twenty feet of timber, perhaps sixty cubic feet in all. Had the *débris* been turned to account, at least one hundred and twenty cubic feet would have been utilized, and thus the sacrifice or cost to the community of the production of the twenty feet beam would have been reduced one half.

'But in reckoning the cost to the community of the timber sold we must add to the value of *débris* connected with the production of timber cut in accordance with licenses obtained

the value of a considerable proportion of the timber obtained surreptitiously, and the value of the *débris* connected with the production of this.

'It is a matter of notoriety, or at least of general belief and report, that much is so obtained. In Kaffraria the license is to cut down during the period for which it is granted as much timber as can be cut up by a single saw during the currency of that same period.

'This restriction in regard to time is not enforced, as the licenses, though issued quarterly, are generally taken out continuously; and without loss to the community, what is cut down in one license is cut up under another. But the holders of licenses being allowed "to sink pits in any part of the forest, they work often on the same pit as many saws as they can; and although this fact is notorious, it is usually very difficult to prove against them, as they choose positions which render them secure from detection"

'Within this Colony the license is different; but I have been told that the restrictions it imposes are also evaded, and I have had it explained to me on the spot how it has been done.

'By such a measure as I have suggested, the waste would be reduced to a minimum by the interest the contracting parties would have in working up all *débris;* and the community would receive, according to the terms of the contract, an equivalent for all that was removed from the forest.

'III. But passing this, the point to which I desire to call special attention is the importance, not only of preventing, but of repairing, the waste which is going on, and this as a means of counteracting the disastrous consequences following the destruction of bush and herbage by fire.

'Looking at the trees cut down only as trees, the removal of these must tend to increase the aridity of the soil unless they be replaced; and it almost seems due to succeeding generations that what is obtained by the sale of indigenous timber should be employed in replacing by trees the trees cut down. It is done elsewhere, why not here? In Scinde three trees are planted for every tree cut down.

'The expense incurred annually in the conservation of the

forests seems to be about £1,300. By the sale of licenses to cut timber there is received about £2,050 per annum. In such circumstances the forests can scarcely be looked upon at present as a source of revenue. If the balance of £750 were applied to the extension of the forests in the same or in other districts, this would only be a carrying out of the idea of conservation to the replacing of what is removed; and this might originate a movement from which the Colony would ultimately derive most beneficial results.

'The whole of this report proceeds upon the fact that the presence or absence of trees has been observed to be connected with the comparative humidity and aridity of different climates. The general opinion is that trees attract rain. It is not thus, but by an operation more certain, that they produce the effect observed; and this operation I shall endeavour now to explain. I have already referred to the effect of shade in preventing evaporation. While this is secured by the trees connected therewith, it will generally be found that the temperature, not only of the earth, but also of the atmosphere, is lower amidst abundant vegetation than in a barren, sterile, stony district, probably from heat being absorbed and retained in a latent form, by the process of vegetation in the one case, while in the other it is reflected unchanged. In consequence of this, if a wind in any degree hotter blow over the district covered by trees, this wind is cooled down; its power of holding water in a state of vapour is thereby diminished, in a geometrical ratio, with every fall of temperature, and a large deposit of moisture follows in the form of dew, of mist, or of rain; the dew and the mist being more favourable to vegetation than even the rain.

'Again, whatever moisture has been taken by the tree from the soil is all, with the exception of what is retained in the structure of the plant, returned to the atmosphere by the stomates on the back of the leaf. By some trees this is done so abundantly that the leaves seem to act as alembics, distilling water, which falls in great drops to the ground. By others, the moisture is returned in such quantities that though no drops fall the tree is surrounded by a thin cloud of vapour like a fog.

But by most trees the operation is effected more slowly; still the moisture is secreted in such quantities that the air around them is more nearly saturated than the air in the arid plain: it has almost as much water in a state of vapour as it can keep in such a state at the temperature it has; and consequently if there come over the trees a wind in any degree *colder* than the air, the air is cooled down, and a quantity of the moisture which it had in solution is deposited in the form of fog, of dew, or of rain.

'But this is not all. Many soils have the power of attracting moisture from the atmosphere, as is done in a superior degree by potash and common salt, and other salts which deliquesce by attracting from the atmosphere water in such quantities that it dissolves them, and they disappear drowned in their own brine, or rather in a shower-bath which they themselves have put in action. This power varies in different soils, and it is found to be increased by the presence in the soil of decayed or decaying vegetable matter. By the fall of the leaves, and in other ways, the soil in which trees are grown becomes rich in such decaying matter, and its power of attracting moisture from the atmosphere is increased.

'Thus it is that the humidity of a district is affected by trees. The trees prevent evaporation, they cause almost every wind that blows to occasion a deposit of moisture, and they impart to the soil the power of attracting moisture from air which itself seems dry, and thus do they operate in a way much more certain of increasing the humidity of the climate than if that operation were such as is generally supposed—the attracting of rain.

'Knowing this, I have everywhere throughout my journey urged the planting of trees. I have a prejudice in favour of the cultivation of trees which are indigenous to South Africa; but my counsel has been—plant any kind of tree—any kind of tree which will grow, or any kind of tree for which there may be a fancy—oak, fir, poplar, blue gum, beefwood, blackwood, —anything. To effect the change of climate desired will require the planting of trees by the million, but every tree planted will contribute to the result required—it may be to an

extent infinitesimally small, but it will do what it can, while by every tree or bush cut down or burned a corresponding influence to at least a similar extent, is withdrawn.

'There prevails an opinion that trees will not grow in many parts of the Colony. Every tree that does grow tends to prepare the climate for the growth of others; and I have yet to learn where is an extensive district in which it would be vain to try the experiment. Where one kind of tree will not grow, another may. Everywhere, I may say, have I seen at farm-steadings blue gums growing with greater or less luxuriance. It was not so when I made the tour of the Colony in 1847. What has thus been done on a small scale at numerous farm-steadings, it is declared by practical men quite possible to do on a large scale; and not with blue gums alone, but with many other trees.

'Mr Tuck, now superintendent of the Botanic Garden, Graham's Town, offered some years ago, on certain terms, involving, I understood, no outlay to others, to cover whole kloofs in the neighbourhood of Somerset East with forests. Mr Smith, of Graham's Town, subsequently offered to superintend the work necessary to accomplish something similar in the vicinity of that city. Neither offer was accepted; but such offers speak the convictions of the practical men by whom they were made. And on such subjects it is practical men alone who can speak with authority. I can only say I see nothing unreasonable in their expectations of success in such enterprises.

'The objections to planting trees which I have heard brought forward are these mainly: It is very difficult to raise trees which are indigenous to the country in other places than those in which they are found; the pot-clay lies so near the surface that few trees can find a root-hold; while the drought, which it is sought to remedy, retards the growth of saplings, and the strong winds would either top or overturn them before they could attain their maturity; the goats browsing upon them would prevent their growth if they should be able to struggle successfully against other difficulties; and the burning of the veldt might at any time in one day lay a plantation worth a thousand pounds in ashes.

'These are objections to which practical men alone can satisfactorily reply, but they do not appear to be unanswerable or insuperable. If South African trees cannot be raised in any particular locality, let others be tried, as has been done with success in many parts of the Colony. If, on exposed situations, the soil be shallow, the drought great, and the wind strong, let the plantations be made in a kloof, and the trees so planted as to afford mutual protection and support. If goats be so destructive, let it be ascertained by a careful calculation of estimated profit and loss, whether in a lengthened period goats without plantations, or plantations with the substitution of some other herds for goats, would be more profitable to the proprietor; it being borne in mind that even should the plantations not be cut to yield firewood or timber within the period embraced by the estimate, they would enhance the value of the farm, and raise its price in the market, if it should come to be sold; or if goats must be kept, let it be ascertained whether the ultimate value of the plantation would not be more than would repay the expense of constructing a fence, or the trouble of sending the goats to feed only on other parts of the farm. In suggesting this, I sufficiently indicate what results I anticipate; but it is a question of fact, and not of theory. The views of theorist and farmer alike must bend to the results of the calculation made.

'In regard to the risk of loss by fire, the money-value of the risk or the premium which would cover insurance against loss can be calculated; and such a calculation would show to farmers the constant expense to themselves and others at which that destructive operation is continued. I know it is maintained that in order to the support of cattle and sheep on many farms, it is necessary that the veldt should be burnt at certain intervals; but I have learned also that the burning of the veldt has sometimes occasioned the destruction of valuable property, and thus the gains, both the whole gains, and, by consequence, the average gains of the period during which this has been practised, have been greatly diminished. If the fear of such consequences from the burning of the veldt by himself or by others prevent any one from improving the

place of his residence as he otherwise would, this is equivalent to another tax on his gains—a tax which, were it levied in the form of a charge for a license to burn his veldt, would be found, I believe, by many to be burdensome in the extreme. In so far as the objection which has called forth these remarks is concerned, the answer is—if the result of the calculation show that it would be more profitable to rear plantations, drop the practice of burning the veldt.

'Thus would I reply to the objections advanced. But should these objections have the effect of preventing the extensive planting of trees by private enterprise, this seems only to render more desirable the conservation and extension of existing forests as a means of counteracting the disastrous consequences following the destruction of wood and herbage by fire.

'It may be that the revenue derived from the forests, after paying the salaries of conservators and rangers, would not do much in replacing the trees which are cut down; but the very consideration of such a measure may originate a movement fraught with far-reaching consequences.

'Should the measure be adopted, if any of our Cape trees yield timber possessing properties which render them peculiarly adapted for certain purposes, attention might be given to the raising of these in accessible localities, and while these during their growth contribute to increase the humidity of the climate, the revenue obtained from the sale of them when fit to be cut as timber would supply means of still more extensively carrying out the enterprise. At what ages such trees respectively can be so employed, I have not ascertained. I do not suppose it would be expedient to reckon upon this source of revenue for many years to come. But within twenty years plantations of the same or other trees, if properly situated, might be made to yield fuel for railway engines and other appliances for the employment of steam power, and for other appliances for manufacturing purposes, and thus be made to supply increased resources for the extension of the forests, if it were seen proper so to employ the revenue thus obtained. And it is possible that the success of the experiment manifested

in its progress might, in the meantime, stimulate private enterprise, if it did not lead to the employment of public funds in planting trees upon an extensive scale in districts in which at present there are few.'

A copy of this memoir was printed as an appendix to my report as Colonial Botanist for the year 1863, and submitted to Parliament in the following year. Shortly thereafter there was issued by the Colonial Secretary, at my suggestion, a circular addressed to Civil Commissioners and District Magistrates, to Conservators and Warders of Crown Forests, and to residents in different parts of the Colony likely to have an opportunity with the requisite interest in the matter to lead them to form an opinion in regard to the condition of the forests and the forest service, enquiring to what extent their observations and opinions were in accordance with what was stated in my memoir. And in 1865 a Select Committee was appointed by the Legislative Council to consider the report.

Before this Committee I was called to give evidence. Amongst other questions and answers proposed and given were the following :—

'1. *Chairman*— You are Colonial Botanist?—Yes.

'2. You are aware, Dr Brown, that this Committee has been appointed to consider your report?—I am.

'3. You have bestowed considerable attention on agriculture and arboriculture, and visited various parts of the Colony?—Yes; I have been from this to King William's Town, thence to beyond the Orange River, and from that to Port Elizabeth I have also visited Clanwilliam.

'4. I believe the forests of this Colony are under the supervision of superintendents at present, are they not?—One of them, the forest in the district of Uitenhage, is under Captain Harrison as Conservator of Forests. Those of George are under charge of the Civil Commissioner of George. Those at the Knysna are under the Civil Commissioner of the Knysna. Those at Katberg and Cedarberg are understood to be under the superintendence of the Civil Commissioners of those places.

I do not know whether it would be premature to speak of the forests of British Kaffraria.*

'5. We would be glad if you can give us any information regarding them ?—In Kaffraria the form of licenses is different from that of those given in this Colony, and I am not aware that any Conservator has been formally appointed.

'6. Has anybody a right to cut wood there ?—No one has a right to cut wood without a license.

'7. Then the duty of the superintendent is to give a license to cut ?—Yes.

'8. What is the nature of the license to cut wood in the George forests ?—At George and the Knysna the license must specify the description of wood to be felled and removed, and no license must cover more than two loads of any kind of wood. It must also state the number of men intended to be employed in cutting the wood specified.

'9. Mr *Wicht.* What is the charge for the license ?—£1 ; but in Katberg it is understood that the charge per license is 6s, whilst in Clanwilliam no charge whatever is made.

'10 What may be the charge in the Zitzikamma forests ?—I presume the same as at George and the Knysna.

'11. And in British Kaffraria ?—It is there charged by the "saw," or so much for each saw, per three months.

'12. Are there any steam saw-mills employed ?—There is at least one mill worked by water-power employed in the Kaffrarian forests, and a special arrangement is made, but upon the same principle.

'13. Have you any idea of the quantity that can be cut with one saw in three months ?—I cannot tell.

'14. What check is there that the party who pays so much for a license takes away only a certain quantity ?—In the George and Knysna forests the regulation is that no timber is to be removed from the place where it is worked, nor is any to be sold till it has been inspected by the ranger, and the proper endorsement made by him on the license. Nor is any timber

* British Kaffraria had not at that time been incorporated with the Colony of the Cape of Good Hope, but the measure was contemplated.—J. C. B.

to be taken to any private homestead to be dressed. This must be done on the ground before it leaves the forest.

'15. Mr *Busk*. Are these rules strictly adhered to?—I believe not.

'16. Mr *Wicht*. You do not know what is the charge per saw in British Kaffraria?—It is 50s for three months; but I believe the arrangement has not been found to work well.

'17. Are licenses a sufficient protection to the forests?—They might be if the system were properly wrought out; but that is difficult, and probably impossible, without increasing the number of rangers.

'18. Are you aware that under Mr Montague, a former Colonial Secretary, the system of licenses was done away with, and that he rather encouraged the sale of forest land to private individuals?—I have heard that Mr Montague was opposed to granting licenses, and that he proposed the sale of the forests.

'19. Did that promote the sale of Crown lands?—I cannot tell.

'20. Parliament then reverted to the old system of granting licenses. How many years is that about, do you recollect?—I suppose about ten years.

'21. Did not those who had bought ground consider themselves ill used when the license system was re-adopted?—They did. I am aware of the fact.

'22. Is there much wood destroyed in these forests?—A great deal. There is very much waste.

'23. A number of young trees are cut down to get at a large one?—In that way a great deal is destroyed; and also frequently a tree is half felled, and found unsuitable, and it is left to decay. Sometimes large valuable trees are cut down, and only a small portion of them used. Perhaps a few beams of twenty feet long are required; these are cut out, and the rest left to decay. One case of this kind is mentioned in my report on the Conservation of the Forests, appended to the Colonial Botanist's report for 1863. The tree measured three feet six inches in diameter, and twelve-inch beams only were required. No other appliances than

the axe and the adze being at command, it was cut to the required length, and chips were cut off the one side and the other till it was reduced to a slab twelve inches thick, and this was sent to a saw-mill to be cut into such breadths as were desired.

'24. Mr *Busk*—Is the charge for licenses, then, only calculated for the worked timber?—Yes. In the forests of George and the Knysna a load of waggon-wood consists of two complete "loops." A load of yellow-wood consists of eighty cubic feet if one log, or of fifty planks of twenty feet by twelve inches, by one inch. A load of stinkwood consists of ten planks, twenty feet by twelve inches by three inches, or fifty cubic feet.

'25. Would it not be an improvement to alter the terms of the licenses to rough measurement, in order to prevent the waste exemplified in your previous answer?—I fear it would be impracticable, more especially in regard to waggon-wood.

'26. Mr *Cock*. Would that apply also to large trees out of which beams and planks are cut?—It is not impossible to carry out such a measure, but it would be difficult. It is very desirable that the forest rangers should mark the trees to be cut down; but that, at present, is found to be almost impracticable; and it would add to the difficulty if he had not only to mark the tree, but to calculate the measurement of it. I should also anticipate unceasing disputes between the ranger and the wood-cutter in respect to the measurement.

'27. *Chairman*. What is the entire revenue derived from the forests?—It appears to have been last year under £275.

'28. Mr *Wicht*. And what is paid to the rangers?—Something under £1000. The revenue is something under £275 over the expenses of conservation and rangers. The expense of conservation of the George forests was last year about £65 over the revenue, and that is the case with others. The Knysna forest and that of the Zitzikamma are those from which alone a free revenue appears to be derived.

'29. *Chairman*. Has there been any alteration with regard to revenue during the last few years?—About three years ago the amount of proceeds was about £750. now it is less than £275.

'30. Mr *Busk*. Can you suggest any mode by which the waste, an instance of which you have quoted, can be prevented in future?—In my original report, already referred to, I suggest that encouragement should be given to private parties to erect saw-mills; the encouragement I contemplate being, granting to them for a definite period of considerable duration the exclusive privilege of cutting timber in a well-defined locality of considerable extent, upon terms satisfactory to all concerned, —satisfactory to them and remunerative to the community for what is cut down or otherwise destroyed.

'31. *Chairman*. In your opinion have the forests increased or diminished within these last few years in size?—They are being considerably diminished.

'32. You have stated to the Committee that considerable diminution has taken place of late years in the extent of the Colonial forests. Have you any suggestions to offer in regard to their preservation, or the planting of trees?— I reported fully upon the subject last year. Queries have been issued from the Colonial Office relative to statements in that report, and all of the replies received to these queries, together with a great deal of additional information, have come into my possession, any portion of which I am prepared to communicate to the Committee.

'33. You referred to a letter to the Colonial Secretary. Will you state the nature of that report?—In that report I gave illustrations of meteorological laws regulating evaporation, adduced a number of facts to show that the destruction of trees desiccated the climate, reported a number of facts illustrative of the waste of timber going on in the forests of the Colony, and suggested certain measures with a view of arresting this destruction of forest timber, and replacing, by plantations, the trees destroyed.

'34. You state that you have received replies to the queries issued from the Colonial Office. Will you state the nature of these replies?—One of the queries was, "To what extent are your observations in accordance with those reported by the Colonial Botanist?" Most of the gentlemen furnishing replies confirm all I alleged, more especially in regard to the great

destruction of timber going on in the forest, and the probability of this increasing the aridity of the climate.

'35. From whom were those replies received?—The circular was addressed to all Civil Commissioners of Districts in which there are forests; to all Conservators of Forests; to all Forest Rangers; and to upwards of forty gentlemen residing in different parts of the Colony of whom it was supposed that they might be able and willing to supply information such as was desired. Replies to these queries were received from the following six gentlemen taking an interest in the conservation and utilisation of the forests, viz.:—J. Blake, Esq., Civil Commissioner and Conservator of Forests in the district of the Knysna; W. D. Vigrim van Alphen, Esq., civil engineer, George; Captain Harrison, Conservator of Forests in the district of Uitenhage, and resident at the Zitzikamma; Mr Pillans, Ranger of Crown Forests in the district of Van Staden's River; Mr Nightingale, Ranger of Crown Forests in the district of Alexandria; and Mr Small, of the firm of Messrs Haynes & Small, formerly proprietors of Victoria saw-mill in forest near King William's Town. Replies were also received from the following eleven gentlemen who have given attention to the planting and culture of trees, viz.:—Lieutenant-Colonel Blagrave, late of Wnyberg, and formerly assistant superintendent of canals and forests in Scinde; E. L. Layard, Esq., F.Z.S., M.E.S., &c., and curator of South African Museum; R. H. Arderne, Esq., one of the commissioners of Capetown Botanical Gardens, formerly timber merchant in Capetown; J. C. Holding, Esq., secretary to the Western Province Agricultural Society; A, G. Mathieson, Esq., overseer of plantations on the white sands of the Cape Flats; J. Templeman, Esq., nurseryman and seedsman, Capetown; F. Metcalf, Esq., Voerhoeden, Caledon; the Hon. H. T. Vigne, Esq., M.L.C., Tygerhoek, Zonder End River; W. Tuck, Esq., superintendent of Botanic Garden, Graham's Town; J. Leonards, Esq., Somerset East; and A. V. Jackson, Esq., Lower Nelspoort. Besides these replies received by the Colonial Secretary in answer to the circular, several communications upon one or other or all of the subjects referred to in it have been made to myself by gentlemen

to whom copies of the circular had been transmitted. Relating to forest economy, there have been seven communications, viz., from the Hon. H. Barrington, of Portland, near Belvidere, Knysna; C. Sutherland, Esq., resident at the Knysna; and for many years past connected with the timber trade of that port; T. Bain, Esq., superintendent of road now being made through the forests of the Knysna and in the district beyond; Dr. Lawrence, medical officer at convict station in the Knysna forest; C. L. Stretch, Esq., civil engineer, formerly engaged in prosecuting preliminary arrangements necessary for the making of these roads; Mr Falconer, formerly connected with saw-mill in Pirie Bush, near King William's Town; and from a gentleman whose communication was marked "private," and must therefore be considered anonymous. From gentlemen taking an interest in arboriculture there have been received eight communications—From P. B. Richardson, Esq., Schoonberg, Langekloof; Walter Smith, Esq., Hermitage, Oatlands, Graham's Town; the Rev. W. R. Thomson, Stockenstrom, Kat River; Robert Hart, sen., Esq., Somerset East; Messrs Parkes Brothers, Wheatlands, Graaff-Reinet; —— Hobson, Esq., Ebenezer, Graaff-Reinet; Dr Meuller, Colonial Botanist, Melbourne; and E. Brown, Esq., Launceston, Tasmania. Relative to the meteorological connection of rain-fall and vegetation,—besides several which were anonymous, consisting of published statements forwarded to me, their have been two communications received from W. L. Blore, Esq., Wynberg, secretary to the South African Meteorological Society, and Mr N. R. Janesch, police magistrate, St. Helena.

'36. Will you state the general bearing of the replies?—To the first query, the replies, as I have already mentioned, are corroborative of what is stated in the report. The second query was, "What is your opinion in regard to the practicability and expediency of carrying out any or all of the suggestions he (the Colonial Botanist) has made?" Most of the answers go to show that it is practicable and expedient to carry out such suggestions. The third query was, "What other suggestions can you offer as a means of counteracting

the evils upon which he has reported?" Several suggestions are embodied in the replies received; one of which is the establishment of a Forest Academy, which is recommended by more than one of the gentlemen replying to the query, another is, the obtaining a report from some party in Europe qualified to ascertain the economic uses to which our timber can be applied. The fourth query is, "What information can you supply in regard to the soil and situations to which different species of indigenous trees are confined?" The information goes to show that they are almost exclusively confined to mountain kloofs. The fifth query is, "Are you acquainted with any experiments which have been made in this Colony in raising from seed trees of South African or foreign species; and if so, what were the results, and what were supposed to be the causes of success or failure?" On this subject much information has been supplied. The sixth query is, "What trees do you consider most likely to prove profitable in cultivation, what are the grounds on which your opinion rests, and what is the course of procedure you would recommend as most likely to secure success?" In answer to this a large mass of information has been received, tending to show that it is most expedient to attempt the artificial cultivation of Australian and European trees.

'37. Mr. *Wicht.* If the Australian trees are exposed to frost, does it not tend to destroy them?—It does, but there are many districts of the Colony not subject to frost; and there are European and other cone-bearing trees which can withstand intense frost.

'38. *Chairman.* What sort of trees do you think ought to be planted as the best species for this climate?—Blue-gum and other species of Eucalyptus; black-wood, and other species of Acacia; cluster-pine, or spar-denne; stone-pine, or kroon-denne; and different species of oaks.

'39. Do not pines stand drought better than any other tree?—I cannot say that they stand it better than all other trees, but they do withstand drought, and grow in sandy soil.

'40. Mr *Pote.* They love a rocky habitat, do they not?—Several do.

'41. *Chairman.* Why are Australian trees preferable?—This is a climate according to their native habitat, and, as a general rule, we find that plants manifesting some of the specific qualities which the species of Eucalyptæ do thrive well in other districts than those in which they are indigenous. For example, it is alleged by Darwin: "Widely-ranging species, abounding in individuals, which have already triumphed over many competitors in their own widely-extended homes, will have the best chance of seizing on new places, when they spread into new countries. In their new homes they will be exposed to new conditions, and will frequently undergo further modification and improvement; and thus they will become still further victorious, and will produce groups of modified descendants."

'42. You state in your letter to the Colonial Secretary, quoting from a report as to the conservation and extension of forests, the following statement: "The expense incurred annually in the conservation of the forests seems to be about £1,300. By the sale of licenses to cut timber there is received about £2,050 per annum, leaving a balance of £750." Upon what is that estimate founded?—It is founded upon the reports of the conservators for the preceding year.

'43. Can you give us any information as to what was the expense of the conservation of forests when they were closed, when no licenses were granted?—The expense of keeping the forests of George and the Knysna closed was £370 per annum, for which expense of outlay no return was received.

'44. Mr *Wicht.* I believe it was on the ground of expediency that the forests were re-opened, the people formerly employed there complaining that they had no means of livelihood. But in your experience, with regard to these abandoned forests, have you seen trees springing up indigenously?—Yes; but most of the trees are of slow growth. All our valuable trees are of slow growth.

'45. In what time do the valuable indigenous trees arrive at maturity, such as the yellow-wood, assegai, and stinkhout?—I will furnish the Committee with the several periods of their growth by quoting a Memorandum showing the different woods

of value in the forests of George, and the age at which they are fit to be cut for trade, furnished by Mr Haswell to the Hon. Major Hope, when that gentleman visited the forests as a Special Commissioner in 1855.

'"1. Yellow-wood.—Grows from seed only; must be 40 or 50 years old before useful timber can be cut from it.

'"2. Stinkwood.—Shoots from the stump when cut; it also grows from seed; must also be 40 or 50 years old to give good timber.

'"3. Assegai.—Grows from seed, and also shoots from the stump; is used for waggon-wood; becomes useful after 7 or 8 years growth.

'"4. White Pear.—Grows from seed, and shoots from the stump; of slow growth, and must be 20 or 30 years old to be useful for waggon-wood.

'"5. Saffran.—Grows the same, and requires the same time to be useful as waggon-wood.

'"6. White Els.—Grows as the others, and requires from 30 to 50 years before useful; it is used for boat-building, for waggon sides, and chests.

'"7. Red ditto.—Ditto. Ditto. Ditto.

'"8. Ironwood.—Grows from seed; of slow growth; used for waggons and for firewood.

'"9. Buckenwood.—Grows as the last, and short; used sometimes for waggon-wood.

'"10. Red Pear.—Grows from seed and shoots; used for waggon and mill-work."

'46. With regard to the oak does it not require a peculiar soil to come to maturity?—It does. Soil that contains a small quantity of iron is favourable to it. As a general rule, soil suitable for the vine is favourable for the oak.

'47. It requires more moisture than the pine?—It does. The pine grows upon comparatively barren spots.

'48. *Chairman.* Can you inform the Committee to what extent the Crown forest lands were sold when the licenses were withheld?—No; that was before I came to the Colony.

'49. Can you inform us what revenue was received from the

forests previous to licenses being withheld?—No; I know nothing of the pecuniary returns of the forests previous to 1861.

'50. Have you any idea what is the market value of timber cut from the forests at present?—I suppose it to be upwards of £12,000 from all parts. In forming this rough estimate I proceed upon the return of Captain Harrison, Conservator in the forests of George for the year 1861. He gives the market value of timber removed from the Zitzikamma, Olifant's Hoek, Klein and Van Staden's Rivers, and Zuurberg; and it is nearly ten times the amount received for license fees and waste wood sold. Finding that last year there were received from all the forests a gross amount of £1,463, I consider I am safe in proceeding on the assumption of the correctness of Captain Harrison's estimate, and stating the market value of timber removed to be upwards of £12,000.

'51. Mr *Wicht*—Does this include freight, and the expense of bringing it to the market?—I do not know. I presume not. I think it was as taken out of the bush, and then sold.

. . . . . .

'91. Mr *Pote*. Have you anything you can communicate with regard to the scale disease of the orange tree?—I have prepared and produce the draft of a report upon the subject of the scale, which, if desired, can be appended as an annexure to the report of the Colonial Botanist for the current year.

92. Mr *van Breda*. There is also a disease of the walnut, the chesnut, and the apple tree; have you also given attention to these?—It is only of late that I have heard of the disease affecting the apple tree, and only now hear of a similar disease affecting the chesnut and walnut trees. If specimens of these diseases be sent to me I shall with pleasure examine and report upon them also in the report of the Colonial Botanist.

'93. *Chairman*. Have you anything to recommend on the subject of forest economy?—I have brought with me statements of the revenue and expenditure of the forests for the last four years. From these it appears that the forests in the district of George, in 1860, yielded a revenue of £312 7s 7d, and the expenditure that year was £234; showing an excess of

revenue of £78 7s 7d. In 1861 the revenue was £293 18s, and the expenditure £234; showing an excess of revenue of £58 11s. (For 1862 I have not been able to obtain returns.) In 1863 the revenue was £188, and the expenditure £234; showing a deficit of £46. In 1864 the revenue was £164 17s 5d, and the expenditure £234, showing a deficit of £69 2s 7d. Thus there was an excess in the first two years of £138, and in the last two years a deficit of £115 2s 7d. On the four years therefore, there was an excess of £23 3s; being an average annual excess of £5 15s 9d.—The forests in the district of Knysna in 1861 yielded a revenue of £1,285, and the expenditure was £451; showing an excess of £834. In 1862 the revenue was £1,087 10s, and the expenditure £416; excess £671 10s. In 1863 revenue £735 4s, expenditure £422; excess £313 4s. In 1864 revenue £635 17s 6d, expenditure £422; excess £213 17s 6d. In these four years, therefore, the Knysna forests produced an excess of revenue over expenditure of £2,032 11s 6d; being an average annual excess of £508 2s 7½d. With regard to the forests in the district of Uitenhage, these are all under the superintendence of one Conservator, and a portion of his salary ought to be assigned to each ward; but the statements of accounts laid before Parliament make it more convenient to reckon the salary, &c., of the Conservator as the expenditure at Zitzikamma, and the salary or allowance to forest-rangers as the expenditure at the several wards intrusted to their charge.—The forests in the Zitzikamma in 1861 yielded a revenue of £645 19s 4d (the market value of timber removed being £6,142 19s), and the expenditure was £278; showing an excess of £367 19s 4d. In 1862 the revenue was £541 16s 1d; expenditure £278; excess £263 16s 1d. In 1863, revenue £377 17s 11d; expenditure £254; excess £83 17s 11d. In 1864 revenue £534; expenditure £254; excess £280. Excess in four years £995 13s 4d; average annual excess £248 18s 4d.—The Olifant's Hoek forests produced in 1861 a revenue of £63 13s 1d (market value of timber removed £410); the expenditure being £97; showing a deficit of £33 6s 11d. In 1862 the revenue was £61 1s 6d;

expendture £97; deficit £35 18s 6d; 1863, revenue £35 16s; expenditure £85; deficit £49 4s. 1864, revenue £60 15s; expenditure £85; deficit £24 5s. Deficit in four years £142 14s 5d; average annual deficit £35 13s 7d.—The Klein and Van Staden's River forests produced in 1861 a revenue of £30 10s (market value of timber removed £360); and the expenditure was £50 10s; showing a deficit of £19 10s. In 1862 the revenue was £41 10s; expenditure £50; deficit £8 10s. In 1863, revenue £8 10s; expenditure £50; deficit £41 10s. In 1864, revenue £19; expenditure £50; deficit £31. Deficit in four years £100 10s; average annual deficit £25 2s 6d.—The Zuurberg forest in 1861 produced a revenue of £66 3s 10d (market value of timber removed £492); and the expenditure was £140; showing a deficit of £73 16s 2d In 1862 the revenue was £27 14s 1½d; expenditure £183; deficit £155 5s 10d. In 1863, revenue £41 4s; expenditure £165; deficit £123 16s. In 1864, revenue £48 16s 3d; expenditure £165; deficit £116 3s 9d, Deficit in four years £469 1s 9d; average annual deficit £117 5s 5d. From the statements made it appears that last year the total revenue from the whole of the forests was £1,466 6s 2d; and the total expenditure was £1,210. There was an excess of revenue over expenditure on the forests of the Knysna and Zitzikamma of £493 17s 6d; but a deficit in the case of the forests of George, Olifant's Hoek, Klein and Van Staden's Rivers, and Zuurberg, of £240 11s 4d; leaving a clear excess of free revenue of £253 6s 2d. Two years ago the free revenue was £750; and the average free revenue for the four years reported was £584 15s 2½d, or £331 9s above that of the last year. The free revenue during the period diminished year by year

'94. Mr *Van Beda.* Can you recommend any other mode of taking care of the forests than what is now pursued under the superintendents?—Without disturbing existing arrangements much might be done; but to secure the full benefit of the forests to the Colony my belief is that very great changes will be necessary.

'95. Will you give us an idea of the changes you would recommend?—I consider it expedient that whatever changes are made the expense should be met out of the revenue to be derived from the forests; and to show what can be done by simply appropriating the free revenue of the forests to the improvement of the forest economy of the Colony, I would submit for consideration the following measures:—

'I. With a view to the conservation of the existing forests against the ravages of fire I recommend: First, the publication and enforcement of the law of the Colony in regard to bush fires. And, secondly, the offer of a reward for such information as may lead to the conviction of the offenders, to be paid to forest rangers and others alike.

'II. With a view to the conservation of the forests against reckless and illegal destruction of timber by wood-cutters, I recommend: First, the re-publication and enforcement of the law of the Colony in regard to the cutting of timber. Secondly, the procuring of accurate reports and diagrams of the boundaries of private propery bordering on forests belonging to the Crown. Thirdly, an increase, if necessary, of the number of rangers, and of the remuneration allowed to them for their services. Fourthly, the commissioning of some one acquainted with forest economy to visit all the forests of the Colony, and, after inquiry and personal observation, to report what practicable regulations would secure a greater measure of uniformity of usage in the management of the forests, and what special regulations may be further required for the management of any.

'III. With a view to the promotion of arboriculture throughout the Colony I recommend: First, that seeds, and to some extent seedling trees, obtained from the forests, and also seeds of Australian and European trees, such as blue-gums, Port Jackson willows, black-woods, oaks, pines, &c., be placed at the command of Civil Commissioners, with permission to employ prisoners in sowing or planting these in suitable places within the districts over which they are appointed. Secondly, that such seeds and seedlings be placed also at the command of municipalities, agricultural societies, divisional councils, and other official bodies holding land in trust for the benefit of the community.

Thirdly, that arrangements be made for the supply of such seeds and seedlings on reasonable terms to the public so long as this may be deemed necessary or possible, without interfering injuriously with the accomplishment of the same thing by private enterprise.

'IV. With a view to the developing of our timber trade, and so making the forests a more productive source of revenue, I recommend: First, the preparation of a detailed report of each forest, specifying the boundary and extent of each patch or clump; the different kinds of timber trees growing in each of them; the numbers, either proportional or absolute, of each different kind; the general magnitude they have attained; and the situations they generally occupy, stating what numbers or what proportions are of easy access, or of difficult access, or in situations altogether inaccessible, but which may be made accessible at a moderate expense. At present we cannot tell what we have. Suppose a demand were to arise for a particular kind of timber, and the purchaser were to say, "I require stinkwood; how many cubic feet can you furnish annually?" There is not a man in the Colony who can tell. "How many stinkhout trees of three feet diameter have you?" Not a man in the Colony can tell whether there are a thousand or a hundred thousand. "What is the extent of your forests? Are there a hundred square miles, or six hundred square miles?" It is the same. We cannot tell any customer what we have. In order to obtain proper reports on this subject it would be perhaps necessary to get surveys made by professional men; but this done, the various forest rangers might furnish accounts of the different clumps at very little expense. I have here a map of the Knysna forests by the Surveyor-General, with the particulars of their contents furnished by Mr Bain; but when we get beyond this, between the Knysna and the Zitzikamma forests, there is a large space of unexplored forest.' Of the Zitzikamma forest I have a similar chart, with annotations, furnished by Captain Harrison. But of the intervening forest nobody can tell what is its extent, or what it contains. Nobody has ever been through it; although I believe Mr Bain has offered to take a pack ox, and, with six

coloured men, cut his way through and report. And even the Knysna forest is but little known. A gentleman from the Knysna writes to me by last mail that he observes that in the Government returns the property in that district is valued at £77,000, but he says if the Government would open up the forest it would be worth, perhaps, £400,000. It is very desirable to have some accurate information on this subject. The reports which I suggest would entail some expense for surveys; but the rangers could provide the particulars as to the contents. Secondly, I recommend the preparation of a report on the fitness of the timber of different trees growing in this Colony for employment in turning, veneering, and other modes of manipulation, founded on experiments to be made by some properly qualified person. I believe there is a great deal of information available on this head which only requires to be collected and tabulated. This would incur some little expense, but not great. And, thirdly, I recommend the procuring information in regard to the most approved measures of forest economy which are applicable to the management of the forests of this Colony by commissioning some one acquainted with these forests to visit the forest schools of Germany, and, if it be thought desirable, to visit also the forests in other parts of Europe, and report thereafter what is seen, or suggested by what is seen there, applicable to the management of forests in this country, whether relating to matters connected with private enterprise or Government control.

'96. You are aware there is an importation of foreign wood into this Colony for sleepers for railways, and purposes of that nature. Do you not think that this Colony is able to supply timber well adapted for such purposes?—I am aware of the fact; and there will always be an importation of timber into the ports of the Colony so long as it can be imported at a lower price than it can be cut and brought to these ports from our forests. But there are districts of the Colony so far from any port that timber could be raised there at a much lower rate than that at which foreign timber can be conveyed from the port. It is also ascertained that much of our forest timber is suitable for railway purposes; but I think it not improbable

that, if the economic uses to which that timber could be put were ascertained, it would be found that its price in the market of the world is such that it would be extravagance to employ it as railway sleepers, and more economical to sell it for other purposes, even though iron or timber sleepers should be imported from Europe.

'97. Would you recommend our Colonial wood as sleepers, is it equal to those imported?—The best authority on that subject is Mr Bourne, who, I believe, has made experiments on the subject, the results of which I have not seen. But I have with me records of experiments made by others, which show that several of our indigenous trees yield a timber well adapted for such purposes. The Cape cedar is fast disappearing from the Cedar Bergen; but it supplies a wood which seems almost indestructible by damp. I was told in the district of Clanwilliam of posts which after thirty years' exposure in the ground were not decayed to a greater depth than the thickness of a sheet of paper; and a post which must have been in the ground a hundred years was still immovable.

'98. You have observed that there are few new plantations going on in this country, and that in a few years there will be few plantations left, owing to the destruction going on. Do you consider that the Government should give encouragement or support to any one who can show the greatest number of trees planted?—Yes.

'99. Is there any further observation you would wish to offer in connection with the developement of the agricultural resources of the Colony?—I can only state, briefly, that every month is adding to my knowledge of these resources; that I see no probability of our vegetation ever obtaining the luxuriance seen in some tropical regions; but that I see no limits to the increase of which our marketable products are susceptible. Some of the measures which I deem requisite to this end I have enumerated in a letter to the Hon. the Colonial Secretary, appended to the report of the Colonial Botanist for 1864. These are the following:—

1. An attempt to arrest the desiccation of the soil and climate, which has been, and is being occasioned by the burning of

the veldt, by the partial or entire abandonment of the prevalent practice.

2. An attempt to counteract the desiccation of soil and climate which has already been effected by the destruction of herbage and bush in time past, by the general and extensive planting of forest trees.
3. An attempt to increase still further the humidity of the climate, by the formation of inland sheets of water, either with or without appliances for the irrigation of arable land.
4. The establishment of an experimental farm, where the probability of profit being realised by the culture of different crops and the utilisation of their products may be tested, and whence information on practical subjects connected therewith may be supplied to all requiring it.
5. The procuring from other countries information, over and above what is accessible in the Colony, in regard to arboriculture and forest economy, in regard to methods of conducting experimental farms, and in regard to markets which are open for our products, the uses to which these products are applied, and the possibility of presenting them in a state calculated to secure a greater demand or higher prices.

To statements made in support of these suggestions in the letter referred to, I would respectfully solicit the attention of the Committee. They will be found in pages 149 and 150 of the report. Not less important than these suggestions do I deem the attention which is being given to measures calculated to facilitate the transport of agricultural products. It would be easy to increase these products at once; but the expense of transport would render the increase unremunerative. While such matters may engage the attention of the Executive and the Legislature, I deem it of importance that attention should be given by agriculturists to the improvement of the quality, rather than to the increase of the quantity of any one of our agricultural products. In illustration of the importance of this, I would refer to the remarks I have made in letters appended to my reports On winemaking, and On the

preparation of aloes. And as one means towards the accomplishment of all that is desired, I consider it expedient that there should be some one official of whom it might be required to report upon all communications made to the Government on subjects connected with irrigation, forest economy, arboriculture, horticulture, agriculture, and botany. Such an official does the Baron von Collet D'Escury appear to have been, while having the designation of Inspector-General of Lands and Forests; and in other lands similar duties have been discharged by officials under other designations. The grounds upon which I consider it expedient that some one should be charged with such duties I shall hold myself prepared to state in detail, if ever the measure come under discussion, and a statement of those grounds should be required. Beyond these, I have no further observations to offer, but any information in my possession is at the command of the Committee, either now or afterwards.'

The queries—Nos. 55-90, omitted here related to subjects connected with cereals, and means of counteracting the aridity of the climate.

The report made by the Select Committee, and which was adopted by the Legislative Council, was as follows:—

'The Committee appointed by the Honourable the Legislative Council to consider the Colonial Botanist's report for 1864, beg leave to present their report.

'Your Committee are of opinion that the information obtained from the evidence of the Colonial Botanist is of a valuable, and, generally speaking, practical character.

'From his unavoidable absence on an official tour, the Committee had it not in their power to complete their inquries; but sufficient information was obtained to satisfy them that there exists a necessity for a change in the system of management of all the forests in the various parts of the Colony,—which, from their great extent, and the valuable timber contained in them, ought to be, and might be made, a source of revenue to the Colony; whereas the trifling amount now received from them is scarcely sufficient to cover the expense of their conservation.

'In the opinion of your Committee, the present system on which licenses are granted for cutting timber is bad, and should be revised. It yields only a trifling annual income, and is very destructive by waste to the forests themselves, which are every day diminishing in size and value. From the great extent of these forests, and their comparatively slight supervision, a compliance with the conditions of the licenses cannot be enforced.

'In the opinion of your Committee, the observations contained in this report respecting the formation of reservoirs, dams, and vleys or shallow lakes, for the preservation of water, are deserving of serious consideration; and if any expenditure on public works is authorised by Parliament, works of this character should occupy a prominent place.

'The Committee, therefore, beg leave to direct the attention of the Council to the further information elicited upon these important subjects by the evidence which they have taken, and to recommend that the same be submitted to His Excellency the Governor for his consideration.'

CHAPTER IV.

DETAILS AND ILLUSTRATIONS OF WASTE AND DESTRUCTION THEN GOING ON IN CROWN FORESTS IN THE COLONY, AND SUGGESTIONS SUBMITTED BY PRACTICAL MEN FOR THE PREVENTION OF THESE EVILS, IN REPLY TO QUERIES ISSUED BY THE GOVERNMENT.

In the report of the Select Committee of the Legislative Council on the report of the Colonial Botanist for 1863, given in the close of last chapter, reference is made to observations 'respecting the formation of reservoirs, dams, and vleys or shallow lakes, for the preservation of water.' These are reported to be 'deserving of serious consideration'; and it is added, 'if any expenditure on public works is authorised by Parliament, works of this character should occupy a prominent place.'

My memoir related primarily, however, to the conservation and extension of forests as a means of counteracting desiccation following the destruction of bush and herbage by fire.

It was what I saw in the Colony in accordance with what I knew of the meteorological effects of forests, of indications of desiccation following such destruction, and what I saw of destruction of forests in the Colony, which led me to advocate the measures in question, and those to which the report of the Select Committee referred. In a separate memoir, subsequently submitted, I reported On Irrigation, and its application to agricultural operations in South Africa; and in another I reported on the Hydrology of South Africa. In this it was argued that the primary and principal cause of the desiccation, and consequent aridity of South Africa, might be found in the elevation and subsidence throughout extensive areas of the earth's surface, and the draining off of water, including the rainfall, in former times and the present, by superficial and subterranean water courses; and secondarily to evaporation, which had in later times been greatly promoted by the denudation of the country by the destruction of forests, and the destruction of bush and herbage by fire.

In treating of the management of Crown forests in the Colony under the old regime, I have, in connection with this matter, mainly to do with the waste and destruction of forests which produced or increased such evils, and my memoir dealt with the conservation and extension of forests as a means of counteracting the consequent evil.

In a volume published subsequently to my return to Europe, entitled *The Hydrology of South Africa*, I have, as a preliminary to detailing the effects of the denudation of the country of herbage and trees on the evaporation of moisture from the soil, on the rainfall, and on the hydroscopicity of the soil, adduced testimony to the fact that the destruction of herbage and trees has been carried on there continuously from former times to the present (pp 167-171); described the effects on the forests of the Cape Colony, which have resulted from the reckless destruction of trees (pp. 171-175); and given details of the extensive destruction of them at different times by fire (pp. 175-194). 'It appears to me a saddening picture. I do not feel that I would be justified in repeating here what I have put on record there, but I consider a knowledge of the facts there recorded necessary to a correct conception of the work of destruction which has been going on—I shall not say for years, but for ages—and I consider that which I have now to add is only comparable to the touches of the painter, which bring out a little more fully details of the picture to which they are added; the reference is to statements made in reply to the queries issued at my instance from the Colonial Office with a view to ascertaining to what extent the observations of others corresponded with mine. The following is a copy of the circular:—

'Colonial Office, September, 1864.

'SIR,—The report of the Colonial Botanist for last year, presented to both Houses of Parliament during the late session, by command of His Excellency the Governor, embraces a report on the conservation and extension of the forests as a means of counteracting disastrous consequences following the destruction of bush and herbage by fire. A copy of that report

has been sent to the office of every Civil Commissioner in the Colony, and it has in other ways been made public.

'If it has come under your notice it will be esteemed a favour if you will report to this office, at your earliest convenience, and not later than the end of October next:

'I. To what extent your observations are in accordance with those reported by the Colonial Botanist.

'II. What is your opinion in regard to the practicability and expediency of carrying out any or all of the suggestions he has made.

'III. What other suggestions you can offer as a means of counteracting evils upon which he has reported.

'IV. What information you can supply in regard to the soil and situations to which different species of indigenous trees are confined.

'V. Whether you are acquainted with any experiments which have been made in this Colony in raising from seed trees of South African or foreign species; and, if so, what were the results, and what were supposed to be the causes of success or failure.

'VI. What trees you consider most likely to prove profitable in cultivation. What are the grounds upon which your opinion rests; and what is the course of procedure you would recommend as most likely to secure success.

'If you have not seen the report in question, and desire to peruse it, an application made at the office of the Civil Commissioner in your district will, it is believed, meet with every attention; and any information you may supply, either on the subject referred to above, or on subjects connected therewith, will be highly valued.

'I have the honour to be, Sir, your obedient servant,

'R. SOUTHEY, Colonial Secretary.'

This circular was addressed, as has been stated, to all Civil Commissioners of districts in which there are Crown forests, to all Conservators of forests, to all forest rangers, and to upwards of forty gentlemen residing in different parts of the

Colony, in regard to whom it was supposed that they might be able and willing to supply information such as was desired.

The replies received, without an exception, corroborated, in so far as they went, the testimony I had given—in some cases supplying a great deal of additional information to the same effect, and in many deprecating a continuance of the waste and destruction going on.

I may state that to me it appeared that the whole system and practice followed in the administration and management of the Crown forests in the Colony was defective and wrong; and I felt that though much might be done to palliate the evil by the topical application of remedial measures calculated to meet particular defects, much more than this was required to secure to the Colony the full benefit of the forests still extant. But the Memoir to which these queries related adduced special cases of evil, with the suggestion of appropriate remedies, and to these, and like evils, the replies made to these queries refer.

Some of the parties to whom these had been addressed addressed their replies to me. In doing so one gentleman, resident in a forest district, but not otherwise having any pecuniary interest in either the destruction or conservation of the forests, wrote to me:—

'Regarding the conservation of the forests in this neighbourhood it is quite a failure, and a practical impossibility to protect them thoroughly against much waste under the present licensing system A wood-cutter obtains, at a cost of 30s, a license from the conservator, for which he is allowed to cut sixty yellow-wood planks, 20 feet long, 12 inches wide, and 1 inch thick; or two complete loops of waggon-wood, a loop being sufficient to build a waggon; and for other kinds and dimensions of wood he pays according to a scale. He then hands the license to the ranger of the wood, and proceeds, axe on shoulder, to cut down the trees he requires—we will suppose it to be yellow-wood for planks. He gropes about in the forests until he finds a tree to his liking, and he fells it; this tree in its fall crushes a large number, sometimes 100 or more young trees and saplings, which are all left to decay; he then proceeds to cut the log into its length of 20 feet, and

squares it in the rough to lighten it; and the remaining part of the trunk, perhaps 18 or 19 feet of excellent timber, but falling short of the usual length of 20 feet, is left, together with the branches, to rot. Some of these logs are 5 or 6 feet in diameter, and yield upwards of 100 planks. He then makes his *slid-path* (dray road) in as direct a line as possible, and of extent to admit some twenty or thirty oxen. Sometimes it is a mile or more long, and he cuts down every young tree that may be in his way, regardless of the waste. Supposing this log to have yielded sixty good planks, which are worth 4s a-piece here, it would be £12, and the ruin caused to the forest for the future in getting this log out would perhaps be some £50 or £100. When the wood-cutter has completed his load of wood at the saw-pit, according to his license, he sends for the ranger of the wood, who comes and sees, and notes down that he has the quantity allowed him, but in what way obtained, or what damage done to the forest, he, the ranger, knows no more about than the man in the moon.

'Another way that much damage is done to the forest is by people (chiefly the coloured classes) hunting honey, and cutting down the trees to get at the beehives.

'The many thousands of poles cut for the telegraph wires have much injured the forest in the immediate neighbourhood of George Town, nearly all the promising young trees of the three most useful species of wood, viz., yellow, assigai, and stink woods, has been cut down. If instructions had been given that none but full-grown trees should be cut it would have answered all ends better; one large log would have sawn up into several dozen poles, the wood would have been much more durable, and quite as cheap, and by taking away the large trees it would have made room for the smaller ones.'

Referring then to the frequent and great destruction of forests by fire, he says, 'I will undertake in the dry season to set fire to any part of the Crown lands or forests without being detected, and any Hottentot or Kaffir, in lighting his pipe, may drop a match or bit of tinder on the grass without its being observed or discovered.' And he concludes, 'I have not yet fallen in with your report, but I have seen an extract from it

in one of the Capetown papers. You may rely on these observations and remarks as correct, and made from personal observation, and you are at liberty to make any use of them you please.'

The Hon. H. Barrington, resident in another forest district, wrote to me as follows:—

'As to the preserving and utilizing the Crown woods, that is the question of questions here.

'The late Mr Montague, with the true eye of an English financier, soon saw that their administration by the Government was a financial error, and at once took a simple, a wise, but a hard course. He closed these woods to all for ever, and offered them for sale. Had his plan not been upset after his death by our Parliament, all the Crown woods would, I think, by this time have passed into private hands, and a hard sum in cash obtained which might have been laid out on roads and bridges along the coast between George and Humansdorp, and Port Elizabeth; and about an equivalent revenue would soon have been obtained from transfer dues; and plots, too, might have been allotted to self-introducing British emigrants.

'You virtually propose a very similar measure, viz., to hand over our woods to a company. It would be better than the present system; but company or no company the timber will be cut down as quickly as means will allow, and converted into cash, but certainly much of the present refuse would then be utilized.'

Mr Blake, Civil Commissioner, and Conservator of Crown forests at the Knysna, who had accompanied me on my visit to these, confirmed all I had alleged, and in his official report for the year said, 'Since my appointment to this place I have visited the greater portion of the forests in different directions, and could not help being painfully struck with the waste of timber which I saw there. I have no doubt there are hundreds, if not thousands, of pounds worth of timber roting on the ground.'

In regard to another form of the evil, Mr Thomas Bain,

engaged at the time in the superintendence of the construction of a road through the Knysna forests, wrote to me:—'The license for cutting what they term spars is much less than for cutting waggon-wood, &c., yet these spars are nothing less than beautiful young trees of all sorts in the prime of life. I think it a shame to tolerate this. When spars are required the wood-cutters should only be allowed to cut the *kuer spar*, which grows so quickly and abundantly that there is no harm in thinning them a little. In fact a full grown forest kuer is seldom longer than just the size required for spars, and if the bark is only taken off before using them they last quite as long as any other spar.

'The wholesale destruction in regard to the cutting of piles should be checked, and the sooner the better. For instance, if a pole is required, and found a mile off the main road, a *slid-path* is cut to it, at the cost of some hundreds of young trees, for the sake of perhaps 40s worth, the market value of the pole to the wood-cutter, who is generally deeply in debt, and must take any rubbishing shop goods in lieu of the wood. In cases of this sort the presence of a good Conservator would be of great benefit to the Government and public interests.'

In a communication which I received from another correspondent are given details of abuses to which the present system of forest economy is open, which is followed by the statement: 'There is no proper check upon the rangers, nor have the rangers any check upon the wood-cutters.' And the writer taking a warm interest in his endeavours to secure the proper conservation of the forests of the district, though, so far as I know, not pecuniarily interested in these, wrote to me a few weeks later:—'Our forests will, I hope, soon become of some note when the railway bills are passed, and all the sleepers are to be cut there.' And he goes on to say, 'I am glad Mr Bourne intends taking the half-grown sleepers as well as the square. The sleepers now cut for the Capetown and Wellington line are certainly ruining our forests fast of sizes 10 feet × 10 in. × 5 in. The aversion of the wood-cutter to saw three, four, or five sleepers out of one log, and the conservation laws not com-

pelling the men to cut trees that have arrived at maturity, leaves no other alternative but their present wanton practice of cutting down a tree of from 14 to 15 inches diameter, which is worked down with an axe into one sleeper. All the small parts, which might be used for spokes, or *fore tongs* of waggons, are thrown away, because, forsooth, the wood-cutter has not taken out his license for waggon wood; and this wood, when once allowed to dry, is never worked again, because it becomes too hard for the axe. The waste is really dreadful. It so happens, too, that for the above sleepers they select the finest assagai and other valuable woods, according to terms of contract.

'If the rangers did their duty, it is my opinion no tree should be touched before they have marked it for the wood-cutter, and authoritatively tell him, and compel him to cut a certain amount of timber out of it. This would not add much to the ranger's duty, and would prevent a vast amount of waste. I think before the new contracts are given out the Government ought certainly to let you come down and make certain restrictions.'

From many quarters there subsequently came to me reports of waste, reckless waste, and destruction, accompanying the method of exploitation followed, occasioned by wholesale robbery and theft, and by fire.

All my correspondents in the Knysna district, I think, without exception, condemned the system of forest economy at present followed. The remedies proposed were various, but the general feeling seemed to be that any reasonable change would be an improvement on existing arrangements.

One of my correspondents says: 'Better close them altogether.' Another says: 'Better sell the forest lands and appropriate the proceeds to the improvement of the district.' A third writes: 'It is my opinion that the Government will find it *economy* in the end to appoint a properly qualified scientific man as Conservator over the Knysna and George forests, instead of the present inefficient way in which the forests are nominally conserved. The Conservator ought to be

constantly travelling, and on the look out after the rangers, and to be under the direct instructions of the Colonial Botanist, or some corresponding official. In this way much good may be done, but the present method is a mere farce.'

Mr Sutherland, agent, who had been for many years connected with the timber trade of the Knysna, writing to me, in reply to the queries, after stating it to be his opinion that the exploitation of the Crown forests should not be undertaken by the Government, but left to private enterprise, goes on to say:—

'With respect to the preservation of forests (I must be understood to confine my remarks to this district only), I would observe that it is much easier to find fault with the existing system of working them than to devise a better in its stead. If the forests were shut to the public, and the timber worked under proper superintendence with proper machinery and appliances, on behalf of the Government, a better revenue would accrue, and a supply for all purposes, including sleepers for railways, could at all times be procured from a *depôt* establishment in the Knysna. But I will not go into details on this portion of the subject, as I believe the Government would be averse to farming their forests in this way. The appointment of sub-rangers, say six to each wood, would be a means of preventing much of the destruction and waste at present caused by the wood-cutter, and complained of with such justice. I do not believe that, except for some sufficient cause, a wood-cutter removes only twenty feet of a tree and leaves the rest of the trunk to rot, for timber is saleable at any length in the log, and long, and especially broad stinkwood planks, are considered relatively more valuable than short and narrow ones. Logs of all lengths, from 15 to 40 feet, may be seen on the beach ready for shipment; and stinkwood planking, from 9 to 35 feet, of all conceivable widths, from 9 inches to about 22 inches, and of 3 or 4 inches in thickness. But much waste and damage takes place by a wood-cutter greedily felling more timber than he is able to work up, often to prevent a neighbour from getting the trees, and from a habit of trying a tree prior to cutting it down, with the view of ascertaining whether it will work freely.

In the former case many of the trees so cut down, after a time, when the sap has run out, and the wood has become tough to work, are quietly left to perish, and no one is the wiser, as a bushranger never does, and in fact cannot, devote any time to bushranging whilst discharging his other duties. In the latter a fair trial is given to the tree, and when the wood-cutter has completed about a third of the task of cutting down he fancies either that the heart is not a good one, or that the grain is tough and crooked; or he discovers a hole in the stem, and relinquishes it in search of another, upon which he may possibly try the same experiment, and at last selects a third. Trees so injured, in a few months naturally lose their sap, dry up, and become useless. All trees allowed to lie in the forest for a few months become useless for timber, excepting yellow-wood, the younger trees of stinkwood, and white els, if cut in the *proper season*. They become, however, very tough, and almost unworkable. The timber procured from such trees does not appear to stand exposure to the sun, and rends and bursts into shreds frequently before it is seasoned for work. An experienced man can distinguish it from good marketable timber at a glance. Sound serviceable wood is procured by removing every particle of the heart of the tree from the wood as soon after the operation of felling as possible.

'Destruction of this kind, and it prevails to a greater extent than one practically unacquainted with forest work has any idea of, would be prevented by the appointment of rangers, whose duties might either be to point out or mark the very trees to be used by the wood-cutter, or to accompany him during the early portion of his labours to see that no waste was committed wantonly, and also, with this view, to examine the stem and crown of every tree cut down, and the *slid-path* employed by the workman. But, as I believe, the Government would be unwilling to incur this extra expenditure, the only method I can conceive for the preservation of the forests would be to close them altogether. If they were closed, and timber were procurable from the owners of private forests only, farmers would turn their attention to the cultivation of trees of rapid growth, such as would supply them with the necessary

beams, rafters, &c., for buildings, and this might result in more extended operations. To this it might be urged that whilst the forests were closed, and no revenue derived from them, the Government would be at considerable expenditure by the maintenance of Conservator and rangers. I would; therefore, suggest that a land surveyor, in connection with some person competent to judge of the value of forests, be employed by Government to lay out land into blocks along the margin of the Government forests, consisting of both forest and pasture land, of about two or three hundred acres each, or more, according to the nature of the forest; that these be given to eligible applicants willing to occupy the land for the expense of survey, and subject to an annual quitrent; that the forests be completely surrounded by such blocks, as far as practicable, and that it be the duty of the occupants to report to the proper authority all cases of theft occurring in the Government forest; that the present staff of Conservator and rangers be dismissed, and one appointed or retained for the whole district, whose duty it shall be to prosecute offenders, collect quitrents, and to examine the Government forests personally from time to time. The forests beyond these allotments, and a very large tract of the best, would still remain, should be sold at an upset price, subject to quitrent, without being put up to auction. I believe by this means an amount would be realised annually, equal at least to that of 1863, which shows (for this district)—

Revenue, . . .	£735 4 0
Expenditure, . . .	422 0 0
	£313 4 0

'Whilst the Government would be clearly the gainers by the amount for which the forests were sold, these would be left uninjured from the reckless waste caused by the wood-cutter, and a fair supply of timber be obtained for the use of the public (in the interim till the forests could be sold) from the occupants of the forest blocks. It is, however, by the sale of the forests themselves that I anticipate great prosperity to the wood trade, and benefit to the district. The purchaser of a valuable piece of forest land would resort to all the appliances that capital commands, and whilst the saw-mill would enable

him to undertake and execute any order for the supply of sleepers, planks, or waggon-wood; and the wood-cutter, unable to work on a Government permit, would find an employer in the forest owner, and be relieved from his present state of poverty and destitution. A matter of much importance would also be better recognised, that is the cutting of timber at only the proper seasons. I have no hesitation in stating that the durability, or otherwise, of all our Colonial woods is attributable mainly to this cause.'

In regard to the working of the system followed at that time in British Kaffrara, Messrs Haynes & Small, the proprietors of the Victoria Saw-Mills in the Pine Bush, near King William's Town, wrote to me, after my tour through that district:—

'Referring to your recent visit to this locality, and the interest you showed in all matters connected with the preservation and economical working of these forests, we beg to lay before you certain facts respecting the present licensing system and its abuses.

'In so doing we must premise that to any one who can pay the amount (50s per quarter) a license is granted with permission to fell and saw timber just when, where, and how he pleases, no kind of supervision being exercised over him. The result is that such men proceed to the likeliest part of the forest, and cut out only the youngest trees, and such as will give the least amount of trouble to procure and saw. The timber thus obtained is invariably destined for the public markets, where none but 20 feet lengths of 1 × 12 planks, and 3 × 4 quarterings, are saleable, hence a considerable amount of waste in pieces less than twenty feet long, or three inches thick, being left to perish. Allowed to sink pits in any part of the forest, they work,—often on the same pit,—as many saws as they conveniently can; but although this fact is notorious, it is usually very difficult to prove against them, as they choose sites which render them secure from detection.

'But without troubling you with a recital of the difficulties arising from one man interfering with another's paths, and simply mentioning the fact that our forests are known to afford

a secure asylum for deserters from the army, and other questionable characters, we beg to offer a few suggestions which, if carried out, would doubtless remove the evils in question, and might yet prove the means of saving an immense amount of property to the Government and public generally.

'If the system of granting quarterly licenses is to be continued a list of all licensed sawyers should be published in the *Gazette*, stating where granted for, and how many saws to be used.

'A forest ranger should be appointed, whose duty it should be to select certain spots where alone pits might be sunk.

'Separate licenses should be granted for chopping waggon-wood, poles, &c., and no license granted unless reasonable security be provided for the due fulfilment of conditions, and the good conduct of workmen.

'When main roads are common to all the expenses attendant upon their repairs should be divided amongst those who use them.

'We are aware that grave objections on the score of expense might be urged against the foregoing, or indeed any other system involving the appointment of a public officer, but we have no hesitation in stating that had such an appointment been made at an earlier period, and before the forests had been so sadly mutilated, the amount would have been saved over and over again. As it is we would suggest that the forests be sold or let on lease for a term of years, subject to such conditions as Government may deem fit to impose. It would then become the interest of the purchaser or lessee that no waste be permitted, and that the produce of the Colony be turned to the best possible account.'

Mr Small subsequently writing to me in reply to the queries issued from the Colonial Office, wrote:—

'The expediency of placing the forests under strict supervision is unquestionable. But whether this would be best accomplished by the appointment of a large staff of forest rangers, or by leasing or selling the forests subject to certain restrictions, is a question upon which I am not prepared to express a decided opinion.

'It is certain that under the system which obtains in this

Colony of admitting an unlimited number of sawyers upon payment of a certain quarterly sum as a fee to an equal right of felling timber in any part of the forest, is one which is productive of an immense amount of waste. I am writing this in a perfectly unprejudiced spirit, as my connection with the mills has ceased. But, my experience goes to show that the introduction of machinery tends greatly to lessen the waste of timber, in fact, must of necessity reduce it to a minimum.

'If mill owners, who must have some capital, were, as lessees, held responsible for the due performance of conditions imposed by Government, with a view to preserve and extend these forests, I have no doubt but that much good would result. As for example, if trees of a certain size and growth only were allowed to be felled, and the forests thus properly thinned out, instead of being cut up indiscriminately, a positive benefit, rather than a loss, would result from it.'

Mr Small also confirmed all I had stated in my Memoir in relation to what I had learned of evils connected with the management of forests in Kaffrara. And he afterwards, in conversation with me, further confirmed it by giving me names of individuals, and specifications of plans, in illustration of every allegation I had made.

Additional confirmatory information was supplied to me by Mr Falconer, who was preparing to engage largely in the cutting of timber by means of a saw-mill, and who had actually commenced operations, if I mistake not, in the Victoria Saw-Mill, subsequently wrought by Messrs Haynes & Small, but who gave up that work in consequence of difficulties and discouragements such as those to which I have referred in my Memoir. From him I learned that he had reason to believe that in that portion of the forest to which his attention was given, for one tree cut down, for which license was paid, *four* were cut down surreptitiously; and further, that a saw-pit, for which no license was paid, was for six weeks in full operation, within 300 yards of the mill in which he was interested, before it was discovered.

In addition to what he stated in his reply to the queries, he communicated to me in conversation much which was illustrative of the same thing.

CHAPTER V.

TESTIMONY INDICATIVE OF A NECESSITY FOR SOME CHANGE BOTH IN THE ADMINISTRATION AND IN THE MANAGEMENT OF THE CROWN FORESTS OF THE COLONY BEING FELT BY MANY OFFICIALS IN THE FOREST SERVICE, AND BY OTHERS.

In the end of 1866 the Legislative Assembly in carrying out a sweeping measure of retrenchment, to which reference has already been made, adopted a resolution to make no further provision for the maintenance of the office of Colonial Botanist. The office was in this way abolished. Before leaving the Colony I prepared a brief report of what had been done, and appended to my report—1. A list of upwards of 160 names of South African trees, shrubs, and arborescent herbs, upon the natural history, or botanic characters, or economic uses of which a report was forthcoming, if desired: the list consisted of English, Dutch, Kaffir, Sechuana, Damara, or Hottentot names, by which the trees were known at the Cape, alphabetically arranged with their botanic synonyms; 2. An abstract of a Memoir prepared relative to the forests and forest lands of South Africa; 3. An abstract of a Memoir prepared relative to the forest economy of the Colony; 4. An abstract of a Memoir prepared relative to arboriculture in the Colony; 5. An abstract of a Memoir prepared on the hydrology of South Africa; 6. An abstract of a Memoir prepared on irrigation and its application to agricultural operations in South Africa; 7. Observations on the agricultural capabilities of the Colony, and requirements for the developments of these.

A day or two before I embarked on my return to Europe Mr Darnell, representative in Parliament of the district of Queenstown, but a resident within the forest district of the Knysna, published the pamphlet which has already been cited, entitled: *The Past, Present, and Future Condition and Prospects of the Government Forests in George, Knysna, and Uitenhage Districts,*

in which are given a copy of a communication addressed by him to the chairman of the Retrenchment Committee, under date of 6th October, 1866, which has already been cited [*ante* p. 67, &c.], and the substance of a statement made by him in the House of Assembly on 8th December, and of the discussion which followed it. In the preface affixed to this pamphlet he writes :—

'"What should be everybody's business is nobody's business," is as true of our forests as of many other things. Neither Parliament, Government, nor the public, care anything about them. The Colonial Botanist's voluminous warnings have fallen hitherto upon unheeding ears, and are now (alas!) retrenched for ever. Nor would the writer [of this pamphlet], probably, have taken so much trouble, had he not a considerable private interest in the satisfactory settlement of the question here raised. Fortunately, that interest depends upon the welfare of the inhabitants generally, and is in no way opposed to it. It has always seemed to him an intolerable absurdity that a tract of country of such extent, possessing, besides its forests, so many of the elements of wealth and prosperity, should remain, owing to short-sighted legislation, a permanent burthen upon the revenue of the Colony. The Knysna district, which comprises only about one-third of the forests, has, in the five years ending with 1865, cost the country £3.773 17s 7d. besides the interest of the sum spent on public buildings, and of that spent on the survey of the forests in 1846.'

As the result of the discussion in Parliament, in which Mr Darnell gave expression to his views, the Legislative Assembly agreed to present an address to the Governor, requesting him to enquire into matters connected with the working of the Crown forests; and in accordance with this address he appointed a Commission to enquire in these matters. The Commissioners were Captain Harrison, Conservator of Crown forests at the Knysna, and Mr Thomas Bain, a Government officer thoroughly conversant with the then existing conditions of the forests, and of the forest service in the districts specified by Mr Darnell, and otherwise well qualified for the duty.

The discussion in Parliament which led to the address being presented to the Governor, and the consequent appointment of this Commission, related to the propriety and justice of throwing open for exploitation on license Crown forests in the immediate vicinity of forests which had been sold by the Government on the terms on which they were sold; but the evidence collected by the Commissioners incidentally revealed much which was unsatisfactory in the administration and management of the Crown forests of the Colony, and this in part I adduce arranging it in sections relating to different points discussed.

Section I.—Condition of the Wood-Cutters, and Views advanced by them in regard to Measures which it was desirable should be adopted.

Very decided views on the question discussed in the Parliament were held by Mr Darnell, and these have been stated explicitly. By the Commissioners it was found, amongst other things, that, as had been indicated by him, there was connected with the economic question of pecuniary returns, an ethical question which was nearly related thereto—the condition of the wood-cutters as this was affected by the form of forest administration followed in the Colony.

While there was a general feeling amongst the wood-cutters that it would be detrimental to their interest to have the forests closed entirely, there was a feeling scarcely less prevalent amongst them that a partial closing of them would be proper.

Mr W. Roberts, not a wood-cutter, but a dealer in timber, said—'I would recommend the forests being closed and sold. I would not recommend the whole of the forests being sold; a portion at least should be retained by Government.'

John Barnardo, a wood-cutter, said—'I think it would be a good plan to restrict the forest work to one part of the forest, but not to close it altogether.'

Ernest Jackson Zaile, who had been a bush worker all his life, said,—'I think it would be a good plan to close the forests partially, and confine the work to certain portions.'

Martinus Laurence, who had been a wood-cutter forty years, said,—'I cannot give an opinion about closing the forests altogether, but I think it would be better to have certain portions of the forests, open and concentrate the wood-cutters.'

Mr Pieter Mettlerkemp, a dealer in timber, said,—'I approve of working the forests in sections, and concentrating the wood-cutters in stations.' And Mr Robb, at Knysna, who had been a ranger of the Crown forests for upwards of twenty years, said,—'I do not approve of closing the forests entirely, but working them in sections, and concentrating the wood-cutters in stations; each family to have an erf or lease at a nominal rent.'

The Hon. Mr Barrington, resident at the Knysna, and a holder of extensive woodlands, in the management of which he took a deep interest beyond that prompted by pecuniary considerations, said,—'As to the sale of the forests, it is entirely a matter of finance, and at present it is not likely the price they fetched in Montague's time will be reached; but the opening of the great coast road will be of greater benefit to the Colony than people at present can comprehend, The division of the forests into compartments is a reasonable plan, provided the Government do not consider is wise to close the forests; but the number of compartments must be considerably greater.'

James Fichat, Esq., Civil Commissioner of George, and Conservator of Crown forests in that district, said,—'I should recommend the forests being partially closed, or worked on the system proposed by Dr White.'

John Blake, Esq., Civil Commissioner of Knysna, and Conservator of forests in that district, said,—'I would recommend the adoption of Dr White's plan of working the forests, and that the wood cutters should be concentrated.'

Mr W. H. Newdegate, J P., who had been resident in the Knysna district for twenty years, said,—'I would recommend the forests being sold when applied for, but not to force a sale by throwing too much into the market. I would recommend the working of forests in sections, to be worked for the six winter months of the year. I would locate the wood-cutters on

ground at an annual rental as near to the work places as possible.'

Mr H. Stroebel, member of the Divisional Council, said,—'The forests should only be worked during the season, and only in portions at a time.' But he added,—'I should be in favour of selling the forests, provided the sales were effected on a regular system. Selling detached pieces is a pernicious practice; roads are cut through the Government forests to private lots in directions to suit the owners, entailing great waste and destruction of timber, when the same lots are accessible by roads already in existence. The cases in point are lots belonging to Messrs Atkinson (the ranger of ward No. 3) and M'Pherson, and Messrs Denyssen and Roberts. These parties are under no supervision whatever, and can cut in the Crown forests with impunity.'

Of the gentlemen named I know nothing personally. I simply cite testimony presented to Parliament by command of the Governor. The testimony of Mr Thomas Horn, a member of the Divisional Council, previously a dealer in timber, and then a shipping master at the Knysna, was—'The waste of timber is very great, caused chiefly from cutting of *slid-paths*, and making of roads to private property. In one instance in particular, a road was made from the main road through the Crown forests for a distance of four miles to the property of Messrs M'Pherson and Atkinson. The whole of the timber cut on this occasion was left to rot; and another road of a similar nature is either commenced, or about to be, to the place of Messrs Denyssen and Roberts, which is already accessible by a nearer and shorter road.' He had previously said—'I am in favour of closing the forests, working them in sections, and concentrating the wood-cutters. I would suggest the forests being worked only in season during the winter months, from the end of February.'

Mr Jacob G. Rex, who had been a ranger of the Knysna forests (ward No. 2) for twenty years, on the other hand said,—'I am not in favour of closing the forests, nor working them in portions, and concentrating the wood-cutters, as I do not think the wood-cutters would leave their present homesteads to work

on such a principle.' And he adds,—'I do not think the season for cutting can be fixed, owing to the different trees blossoming at different times.'

Against the closing of the forests the Commissioners found a very general objection amongst those whose testimony they collected, and facts were adduced which went to show that to do so would entail great privation and suffering upon a large body of wood-cutters. I state the fact, without discussion of the question to what extent ought such a consideration to determine the action of a state represented by the Government. Like consequences follow many changes in trade, commerce, and manufactures; but it becomes an important question when there is existent a considerable body of men trained and fitted for special work, and fitted for few, if any other occupations—men whose services can be had at a moderate expense, but who cannot otherwise provide for the support of themselves and their families: What can be done, consistently with justice to all, in accordance with sound economy?

It appears from evidence given that at that time labour could be hired by the Government on what was deemed reasonable terms, if it should be determined to exploit the forests by Government officials, and not by continuing the system of granting licenses to others to fell what they desired.

From the evidence appended to the report of the Commission it appears that Martinus Laurence, who had been a wood-cutter for forty years, said in evidence given by him,—'I approve of the Government working the forests themselves; and labour could be had at 1s 6d per day and rations.' Similiar was the testimony of J. Barnardo, who had been a wood-cutter for ten years,—'Should the Government decide on working the forests themselves people could be got for 1s 6d per diem, and rations.'

With changes occurring in the lapse of time the rate of wages changes. These statements must be looked at in connection with the current rate of wages for agricultural and other labour. The charge seems moderate; and with the certainty of constant employment, if fitted for the work and

well-behaved, even a small wage would be a boon. And the evidence collected by the Commissioners tells of disadvantages under which the wood-cutters then laboured. The Hon. Mr Barrington, who had lived in the neighbourhood of the forests for many years, testified,—'The condition of the wood-cutters for many years past has been getting worse and worse; the last year or eighteen months it was desperate. This year, solely in consequence of the fall in the price of provisions, it has been better. I consider the present impoverished condition of this part of the country entirely due to the management of the Government forests.' Martinus Laurence said,—'When the forest was closed (which it was for a time), I was better off than I am now. In those days wood was at a better price. Working in the private forests on the deal or share is better than a license in the Government forests, for the reason that we cannot always get the money for the license.' And John Barnardo said,—'The wood-cutters are not so well off now as they were five or six years ago; wood is about half the price.' Gert Pienaar, who had been a bush worker for thirty-two years in the Zitzikamma forests, said,—'The wood is so cheap now that the wood-cutters scarcely make a living. When the licenses were increased to thirty shillings wood was high in price, and we made a very fair profit, but now we barely cover the price of the license.' But he said also, 'I think it would be the ruin of the poor wood-cutters if the forests were closed.'

Mr William Roberts, who had been eighteen years a resident in the neighbourhood of the Knysna forests, and had been a dealer in timber for twelve years, said,—'When the forests were closed the bush workers were far better off; they cultivated their lands as well as worked timber, and were generally able to pay their way. At present they are all but destitute. At that time they had oxen of their own; but now few have them of their own, being in most cases mortgaged to shopkeepers and others.'

Carl Stephanas Marais, who had been ranger of ward No. 1 of the Knysna forest for nineteen years, said,—'When Mr Fichat was Conservator I issued licenses, and often to the

amount of £15 or £16 a month. I am not allowed to do so now, and the revenue is reduced to about £35 per annum. I do not attribute this falling off entirely to my not being authorised to issue licenses, as many of the wood-cutters have become *transport-riders* since the opening of Meerings Poort. The wood-cutters are afraid to come and work now, since they are allowed but ten days free grazing for their oxen (in which time it is impossible to work a load of wood), and after that time they are required to pay £3 as the hire of Government ground. I do not approve of closing the forests. It is a means of livelihood to many poor people who would otherwise have starved during the late drought.'

Ernest Jacobus Zeilie stated,—'I have been a bush-worker all my life. I think the wood-cutters were worse off when the forests were closed than they are now. We could at one time make a living out of the forests, but wood is so cheap now that we can scarcely live.'

Mortimer Lloyd, who had been ranger of the Zitzikamma forest, ward No. 2., for eleven years, said,—'I do not think it would be a desirable measure to close the forests, as the wood-cutters would not be able to make a living. Even now, with the low price of wood, the wood-cutters can hardly make a livelihood.'

The low price of woods so often referred to, appears to have been attributed by some at least to private proprietors having reduced the license fee to £1. Mr P. Mettlerkemp, who had been a resident at the Knysna nearly seven years, and had dealt in timber, said,—'Most of the forest proprietors issue licenses at £1.' He had just said,—'I think the license fee might be reduced;' and he had previously said,—'I have the management of a private forest, and there is a great deal of work done just now. Licenses are issued at £1, or at a fourth share of wood worked. In my forest I have issued licenses to the amount of about £8 to £10 per month; this is exclusive of the deal or fourth share.'

Mr Blake, Civil Commissioner, and Conservator of forests at the Knysna, said,—'The timber licenses are now too high. Private proprietors issue them at £1 per load, and I think Government had better do the same.'

Charles M'Master, who had resided at the Knysna for twenty years, had been a wood-cutter, and for a few years previous to giving his testimony, been a dealer in timber, also said,—'I think the license fee is too high now the forest proprietors have reduced their license to £1.'

The Hon. Mr Barrington said—'When the late Mr Montague closed the forests, and offered them for sale, I became a purchaser of one lot under the understanding that the forests would never be re-opened, in accordance with notice of 26th May, 1847. When the forests were closed the wood-cutters were thrown out of employment, and were compelled to come to terms with the proprietors of forests. I deemed the measure a wise one, but hard on the wood-cutters as a class, as they were compelled to come to terms with private parties. My view has always been that the forests should be worked on wages, and *not on shares*; but the wood-cutters declined fair wages, but were anxious to work on shares, which was then understood to be two-thirds manufactured wood to the proprietor, delivered at the saw-pit. It was my habit to stamp all the wood, one stamp on my share, and two on the wood-cutters. The wood, as soon as stamped, became their property, but not before.

'I work very little timber for sale in consequence of the competition. As a forest proprietor I am naturally in favour of closing the forests; and had Mr Montague's views been carried out I believe the greater part of the forests would now have been in the hands of private proprietors, and the Government have had the benefit of a large sum of money, saved a great sum in conservation, and a steady and increasing revenue from transfer dues.' Then follows the testimony I have cited in regard to the effect on the condition of the wood-cutters of the course adopted.

Mr Maurice F. Rowan, who had been a ranger, said,—'I am of opinion that the closing of the forests would be a saving to the Government, but it would impoverish the wood-cutters, as the Government forests being closed, the proprietors of private forests would enjoy a monopoly.'

Mr William Robertson, who had resided in the neighbourhood of the Crown forests for twenty years, and was then acting

as ranger of the George forests, ward No. 2, says—'I am in favour of closing and selling the forests. I am convinced it would benefit the wood-cutter, preserve the young timber, and by means of a quit-rent, bring in a certain revenue to the Government.'

I am by no means indifferent to the question of what did justice to the purchasers from Government of certain forest lots require: *Fiat justicia ruat cœlum.* At present I am citing only testimony to the hardships to which closing the forests might have subjected others who were, as well as the holders of forest lots, entitled to have such rights as they may have possessed protected against infringment by acts of the Government remedied, or other.

Notwithstanding the interpretation put upon the Government notice of 26th May, 1847, by more than one of the purchasers, the forests unsold had been opened for the sale of wood on license; apparently this was to the detriment of the interests of the wood-cutters; and yet a re-closing of the forests seems to have been deprecated as likely to prove then still more prejudicial to their interests. At the same time it is the case that good may have been educed from evil. Mr Thomas Horn, a member of the Divisional Council, who had resided at the Knysna for the previous twenty years, first as a dealer in timber, and subsequently as a shipping-master, said,—'The low price of timber has forced the wood-cutters to turn their attention to other things. Hitherto the people of Plettenberg Bay bought all their own corn; this year they have grown 2000 muids of wheat alone, exclusive of barley and rye.'

There are sundry questions suggested by the statements cited, amongst others:—Was not wood being disposed off at a price below its value if this were reckoned at the price of production? If this followed from a competition between the Government, and those to whom they had sold forests, were not both parties injuriously wasting their property in trying to undersell each other? And if the private proprietors were able to undersell the Government with a profit, or deemed it profitable to realise at what might be a sacrifice, would it not

have been true economy for the Government to leave to the private proprietors to supply the current demand, while needful measures were taken to open up the more extensive Crown forests, and prepare them for being administered and managed on an improved system? Such questions may naturally have suggested themselves in what was then the state of the case, and probably did so; but the one point to which attention is here directed was that a supply of labour such as was required for carrying out forest operations by Government officials was to be had at a moderate expense, with benefit and not disadvantage to the men employed; and while there existed amongst the wood-cutters an opinion that it would be injurious to them to have the forests closed entirely, thought a partial closing of them might be advisable, there was also a general opinion that it would be well to restrict the time for felling of trees.

Mr Roberts, a dealer in timber, after giving his opinion in favour of Government closing the forests, and selling what might be felled, added,—'Should, however, the Government determine on retaining the forests I would point out the necessity of only working them in season. By this means the timber would be more valuable, and the wood-cutters could cultivate their lands and gardens as well as work wood.'

John Barnardo, a wood-cutter, and owner of a portion of forest, said,—'I approve of timber being felled in season only, but there would be some difficulty in deciding which is the proper season, as the woods are not all in season at the same time.'

Mr Wm. M'Pherson, a member of the Divisional Council, a dealer in timber, also said,—'It is a difficult matter to fix the season for felling timber, as the time of shedding the berries varies so much, according to the dryness, or otherwise, of the year.' Mr P. Mettlerkemp said,—'It is a hard matter to decide on the proper season for working the different sorts of timber; but taking one season with another, I think the winter months preferable.'

Mr Mortimer Lloyd, who had been ranger in the Zitzikamma forests for eleven years, said,—'I think the winter months are the best for felling timber. I think it would be a good plan to

close the forests during the rest of the year.' Gert Pienaar, a bush-worker for thirty-two years in the same forests, said,—'It is difficult to determine the best season for felling timber, but I think for general purposes the winter months are the best.'

Restrictions on the season of felling had repeatedly been proposed, and reference to some of these have previously been made.

The measure of felling only in specified sections had been for years carried out by Captain Harrison, one of the Commissioners, while Conservator of forests at the Zitzikamma; and this had been done with the happiest results.

But the matters mentioned were not the only points to which the Commission had to give attention; and a selection from the evidence collected by the Commissioners reveals more explicitly some of the evils for which a remedy was desired.

Section II.—Defective Forest Supervision, and Consequent Waste.

The Hon. Mr Barrington, of Knysna, in giving evidence, said,—'Under the present system of conservation I think it impossible to prevent the wood-cutters removing more wood than they are entitled to by their license, and that it is impossible to conserve the forests without the services of active and vigorous men, under an active superintendent; and even then without rules so stringent that the wood-cutters would endeavour to seek other modes of existence when they had felt from experience what control is. Under the present system, the Conservator, being also resident magistrate, it is contrary to a principle of justice. In Mr Haswell's time the visits of the Conservator were very frequent. He resided at Belvidere, and was well mounted. But I have only knowledge of one visit from the present Conservator. Shortly after his appointment (four years ago) he came at my request to examine if the Government wood-cutters were cutting within my line or not; when it was ascertained that they had not cut within my line.'

Similar was the testimony of Mr H. C. Stroebel, member of the Divisional Council. He, when examined, said,—'I have

been a timber dealer for more than thirty years at the Knysna, and I have had many opportunities of observing the present system of conservation, and think that it works very badly, and that some change is required:—1st, There is great waste; 2nd, The rangers do not do their duty.' And speaking of the forests from which he obtained his supply, he said,—'To my knowledge the Conservator has visited the forests but twice during a period of about four years. The Conservator has never kept horses. He has bought one within the last three or four days. The rangers keep horses, and visit the forests. The ranger of ward No. 3 has lately visited the forests about three times a month; before this he only visited the forests about once a month. He inspects the timber at the saw-pits, but he never enters the forests to see what is going on. The ranger of ward No. 2 has visited the forests about every ten days on an average, but that is only within the last three months; he never enters the forests to inquire into the waste, &c. The rangers formerly dealt in timber. Ranger of ward No. 2 did so within the last three months; they have given up the practice now.

'The time allowed for working a load of wood used to be thirty days; it however often extends over *six months*. This I know from my own experience. I attribute most of the irregularities going on to this cause. . . . . The carelessness on the part of the Conservator and rangers in enforcing the forest regulations has materially affected the price of timber. If licenses were paid for all the timber worked the price would not be so low; but the market is overstocked, and my impression is that a great deal of the wood is *stolen*.'

In accordance with this was the testimony born by Mr William M'Pherson, who had been a dealer in timber at the Knysna for the previous twelve years. He said—'The forest regulations are carried out by the rangers as well as they can, but their wards are too extensive to enable them to fulfil their duties To the best of my belief the Conservator, in his capacity as such, has visited the forests but very seldom, but he travelled through, in his capacity of visiting magistrate at Vlugt station, when the convicts were there. . . . . I am

decidedly of opinion that there is thieving going on, not only in the Government forests, but in the private ones too, adjoining the Government forests. I am a proprietor of forests adjoining Government property, and issue licenses at the rate of £1, or a fourth share of the timber. There is a road from my property through the Government forests to the main road. I believe occasionally parties holding Government licenses work wood in private forests, and the holders of private licenses do the same in Government forests, thus setting both parties at defiance. I have known licenses completed in a week's time, and others kept for a long time over the stipulated time; and I think that this practice is the cause of much thieving.'

Mr Thomas Horn, member of the Divisional Council, shipping master at the Knysna, and previously a dealer in timber, being examined, said,—'About 1050 tons of timber were shipped last year. I reckon each load equal to about one ton and a-half. My opinion is that twice as much timber is cut as there are licenses issued for, and I think the Government forests are being destroyed. The rangers do not visit the stations often enough. . . . The Conservator has been in office about five years, and to my knowledge has visited the forests of the westward but once or twice. On the eastward side he may have been two or three times; but in his capacity of visiting magistrate he used to travel through the forests on his way to the Vlugt every month or six weeks.'

Charles M'Master being examined, said—'I have been a resident at the Knysna for the last twenty years. I have been a wood-cutter, and for the last five years, a dealer in timber. I think the rangers do their duty as well as they can, but under the present system it is impossible for them to prevent thieving. Waggons come from Oudtshorn with Colonial produce, which they barter for wood with the cutters, and much timber is removed in this way without the knowledge of the rangers. Wood-cutters are supplied with two or three licenses at one time, and an opening is thus left for defrauding the parties who have paid the license fee. In some cases I have known a license hold good for many months (though the specified time is thirty days), and in one instance Isaac Tait

informed me he had one a year old. I have been so often defrauded of my wood by the cutters that I have given up supplying them with licenses.' He gave details of how he had been so defrauded, and added, 'I think the present system altogether faulty, both to the dealer and to the Government.'

Mr P. Mettlerkemp stated,—'I have been a resident at the Knysna nearly seven years, and have dealt in timber. I think the forest regulations have been enforced during the last three years. Prior to this period licenses were issued most irregularly in many cases. The storekeeper gave an order to the ranger to issue a license to a party named, and in most cases the timber was worked and delivered before the license was paid for. The practice was stopped by Mr Blake. I do not think much thieving goes on on this side the Knysna. There was a case about a fortnight ago of a load of wood being cut at Kruis River without a license. As soon as it was discovered the ranger went and stopped the man working; the man took out a license for the wood at once, and he was not prosecuted. I think there is a great deal of thieving goes on in the private forests on the other side of the Keurboom River. A great deal of the timber, which goes over the new road to the Lange Kloof, comes out of the private forests.'

In connection with this testimony by Mr Mettlerkemp I may mention that Mr R. H. Atkinson, who had been ranger of Crown forests for twenty-one years, being examined, stated—'There is fully thirty thousand acres of private forests in the district of the Knysna. There is a great deal more wood worked in the private forests than in the Government.'

Mr M'Master had stated—'A ranger should be stationed in the neighbourhood of the Kruis River, to protect the forests from that side.' Mr Atkinson testified,—'To the best of my knowledge the Conservator has visited Kruis River, and Krantry bush work places, but once since he was in office, for years.'

J. P. Swemmer, ranger of Crown forests of George (ward No. 1), and who had been ranger for eighteen years, being examined, stated,—'I visit the forests in my ward once a week, and the regulations are strictly enforced. I was ranger when

the forests were closed. Thefts of wood sent as firewood and spars were more frequent than at present. I recollect two or three cases when timber was felled, but the parties were discovered before removing it. . . . I have been sent twice by the Conservator to inspect the forests in ward No. 2. On both occasions I found timber being worked and removed without license. My visits were both made during the month of February last. I reported the matter to the Conservator, and eight men were brought up, four of whom have been committed for trial. Judging from the appearance of the forest, and from the number of timber waggons passing through George, I am of opinion that extensive robberies have been going on for the last ten years. . . . There are private forests in the district, but they are not worked.'

William Robertson, who had been resident in the neighbourhood of the Crown forests for the previous twenty years, and was then acting as ranger for ward No. 2 of the George forests during the suspension of the incumbent on account of complaints made against him by the Conservator, being examined, said, – 'For the last six years I have been residing close to the forests in ward No. 2 of the George forests, and have had every opportunity of observing the present system of conservation. I am now acting ranger for ward No. 2. In my opinion the present system of conservation is a complete failure. I form this opinion from the fact that the young trees are not preserved as they should be, and from the great destruction caused by the making of *slid-paths*, and the general waste of timber. The forests in this district have been worked throughout; some portion was supposed to have been closed, but what part, or when, was never clearly ascertained. The supervision of the forests has been very lax, both on the part of the Conservator and his rangers. The Conservator has visited the forests in this ward but once to my knowledge, and that was since the discovery of the recent depredations within the last six weeks. Prior to the horse sickness, about two years ago, the ranger occasionally visited the forests; but since that time I have only known him go twice, and on both occasions within the last six weeks. I know from my own experience that several loads

of refuse wood, for which I have had licenses, have never been inspected, and I have been told it was not necessary. I attribute the late depredations entirely to the careless supervision of the forests by the Conservator and rangers.'

Having stated, 'The rangers are lax in the performance of their duties,' he went on to say,—'In ward No. 2, as a dealer in timber, I have been frequently told by the wood-cutters that they could not deliver their timber because the rangers would not come to inspect it. These complaints were frequent.'

In keeping with the evidence collected in regard to the thieving going on consequent on the imperfect discharge of the duties of forest officials, was the testimony collected in regard to the reckless waste of timber.

William Roberts being examined, stated,—'I have been eighteen years a resident in the neighbourhood of the Knysna forests, and have been a dealer in timber for twelve. I have seen the general mode of working the forests, and must say I cannot approve of the system. The forests are cut about in all directions, and if the system is persevered in stinkwood will be exhausted in two or three years, as they now already cut young trees which are perfectly useless.'

But there were those who discharged their duties zealously, and with satisfactory results; and testimony born by others show that such results may be obtained. Carl Stephanus Meyer, who had been ranger of No 1 district of the Knysna forest for nineteen years, stated to the Commissioners,—'I go three times a week over my ward, and enforce the forest regulations strictly. I have never found out any cases of timber theft.'

G. W. Pienaar, a bush worker in the Zitzikamma forest, said,—'We are allowed a fortnight to work out a license, which is quite enough in fine weather.' Thomas Brown, a wood-cutter in another part of the same forest, said,—'The time allowed for working out a license by the Conservator is a fortnight, but I seldom take so long. I have often worked it out in a few days.' He adds, 'There is little or no timber wasted in our section of forest. No young trees are allowed to be cut

for disselbooms of assagai wood. We are not allowed to cut upright and other yellowwood for spars. We only cut keur and other woods which are not used for waggon and building purposes.'

John Barnardo, a wood-cutter, being examined, said,—'I have been a wood-cutter for ten years. I have been working both in private and Government forests, and am pretty well acquainted with the forest regulations now in force. I do not think there is more waste in the Government than in the private forests. Wood is becoming scarce, but in the mountains there is plenty of timber.' He said also, 'We have a bush of our own, and we look after it well; there has never been a case of theft yet; we are always on the look out.' And in regard to Meyer he testified, 'The ranger visits the forests sometimes weekly, and sometimes not for three weeks; but the timber is always inspected before leaving the forests. To my knowledge the present Conservator has visited the forests but once, and that was last week; he was at our saw-pit, but I am not aware whether he visited the others. The last case of theft of timber was about seven years ago. I think, if I were inclined, I could steal wood without fear of the ranger, but I should be afraid of the other wood-cutters informing on me.'

In accordance with this is the testimony of Mortimer Lloyd, —'I have been ranger of the Zitzikamma forest, ward No. 2, for eleven years. . . . I reside close to the work place, and visit the working places and forest twice or three times a week. I never allow any wood to be removed from the saw-pit without counting and inspecting it. When I first came here the wood-cutters worked in different parts of the forest, and in many places. Now they are all concentrated, and work in one section of the forest. This has been done by order of the Conservator since March, 1866, and has proved a beneficial measure, as it is impossible under this system for wood-cutters to steal timber without detection. The patches of forest which have been much worked are now closed, and left to recover. The Conservator of forests has the regulations carried out strictly, and does his work efficiently. He is considered, if anything, too strict by the wood-cutters. We never allow young assagai

or yellowwood to be cut for spars; only the keur, kamasie, kershaut, and klipels, are allowed for such purposes. The wood-cutters are allowed a fortnight to work a license, which I consider quite long enough in fine weather. . . . The Conservator has always kept horses for his work. He generally keeps three, although he is only allowed forage for two horses.' This is only in accordance with what any one acquainted with the Conservator referred to—Captain Harison, a member of the Commission—would have expected. And other Conservators there were not only faithfully, but heartily, discharging their duty.

James Fichat, Esq., Civil Commissioner of George, and Conservator of Crown forests, stated,—'The revenue for 1867 was £90; it is now gradually increasing, especially since I have found out the timber thefts in ward No. 2. I have instructed my rangers to enforce the regulations most strictly, and to make a monthly report of all that occurs. . . . I have now the forests in perfect working order, and I have every confidence in my present rangers. . . . I am strongly in favour of having no wood cut except in season.'

Ernest Jacobus Zeilie, who had been a bush worker all his life, said,—'As far as I am concerned I think the ranger does his duty strictly. If he is not at this side of the forest he is inspecting another part. The Conservator, the Civil Commissioner of Knysna, has been to the forests but once, and that was last week. I remember only two cases of timber theft.'

Similar was the testimony of Mortimer Laurence, who had been a wood-cutter for forty years,—'The ranger visits the forests pretty frequently, and never allows any wood to be removed without being first inspected by him. The Conservator has only been to the forests once since he has been Conservator, a period of about four years. Mr Haswell, the former Conservator, visited the forests every week, generally accompanied by the ranger, but sometimes by himself. . . . I could steal if I liked without its being known to the ranger, but we are afraid of our mates. I do not think their is any timber stealing going on. The ranger does not deal in timber.'

Section III.—Location of Wood-Cutters.

There was yet a third matter to which the Commission found it expedient to give their attention—the location of houses for wood-cutters and forest-warders employed in the forests.

The Hon. Mr Barrington, in giving evidence before the Commission, said,—'If the Government were to locate the wood-cutters in villages, and registered them, they would be controlled under more moderate cost than at present, and the forests efficiently conserved.'

And others gave testimony similar in character, in connection with testimony born by them in regard to limitation of fellings to specified sections and a specified season.

Mr William M'Pherson, member of the Divisional Council, who had been a dealer in timber for twelve years at the Knysna, and a proprietor of forests adjoining Government property, said,—'In my opinion the forests ought to be closed entirely. If they were closed there could be but little thieving; but I would not advise their being sold just yet, in consequence of the low price of timber. I think they would realise good prices in the course of a few years. . . . If the forests were closed they would still require supervision, if it were only to prevent the practice of honey-hunting, by which very great destruction of timber is caused. I think it would be a very good plan to locate the wood-cutters on suitable places in the forests, and allow them to hold their erven at a small quit-rent for a period not exceeding twenty-one years, and under stipulation that they should work and improve their property.'

Mr P. Mettlerkemp, a resident of the Knysna, who had dealt in timber, said,—'I highly approve of these poor people being granted small allotments, at a small quit-rent.'

Thomas Brown, junr., who had been a wood-cutter for twenty-two years, said,—'I do not think it would be advisable to close the forests altogether. The system of working the forests in sections only, and of concentrating the wood-cutters, answers very well here—Storms River, Zitzikamma forest,—and seems to give general satisfaction. . . . I approve very

much of the plan of giving the wood-cutters small pieces of ground on a nominal quit-rent, which would induce them to cultivate the ground. If the timber is felled in the winter months (the best season), and the forests closed for the rest of the year, it would be a very good arrangement. The wood-cutters would then be compelled to cultivate the ground to a greater extent than is now done. . . . The ranger lives close to the section of forest now open, and visits the work places very frequently, and at uncertain periods. No timber has ever been removed from the saw-pits without the ranger's knowledge.'

G. W. Pienaar, who had been a bush worker in the Zitzikamma forests for thirty-two years, said,—'In former days the wood-workers were allowed to work wherever they wished, but now they are all concentrated near where the ranger resides. I do not think it is possible for any man to take any timber away without being detected, either by the ranger, who resides at the work places, or by the Conservator, whose house all the timber has to pass. No wood has ever been removed from the saw-pits before it is inspected and counted by the rangers. . . . I think if the Government were to grant small pieces of ground to the wood-cutters on a nominal quit-rent, they would be very much better off than at present, as few ever think of cultivating ground for fear of being driven away when once settled.'

Section IV.—Report of the Commissioners.

The following is a copy of the report of the Commissioners:—

'Report of a Commission appointed by His Excellency the Governor to inquire into matters connected with the working, &c., of the Crown Forests, in pursuance of an Address from the Honourable the House of Assembly, dated 11th December, 1866.

'George, May 4, 1868.

'The Honourable the Colonial Secretary.

'Sir,—Agreeably to your letter of the 4th February, 1867, appointing us Commissioners to inquire and report upon several matters connected with the Crown forests, as contained in an

address of the House of Assembly to His Excellency the Governor, we have now the honour to furnish our report, the result of inquiries derived from statements of all officials, dealers, and the most intelligent wood-cutters connected with these forests, whose evidence is hereto annexed.

'"1st. As to the reclosing of the Crown forests in the George, Knysna, and Uitenhage Districts, the survey of that portion of them not already surveyed, their valuation, and division into suitable lots for sale."

'We are of opinion that the reclosing of the Crown forests entirely would be an injudicious measure. The wood-cutters are an impovershed class, and to deprive them of their only means of subsistence would be their ruin. Few of them have land of their own, and, brought up from childhood to their occupation, are entirely dependent upon the forests for their daily wants. Besides, if the forests were closed, a Conservator and staff would still be required to protect them, whilst they produced no revenue whatever to meet the expense of that protection; and we think that the introduction of a sound system of conservation would remedy most, if not all, the evils which would render such a course expedient.

'To sell the forests of George, Knysna, and Zitzikamma, would be to sacrifice them. As an instance, we would mention that at the Knysna a valuable tract of land (forest), about 800 morgen in extent, and where an axe had never yet been laid, was sold about six years ago for the paltry sum of £30, half of which was immediately bought by Mrs Atkinson, the wife of one of the rangers, for £60. This recommendation does not, however, apply to the worked-out, non-producing forests of Olifant's Hoek, Van Staden's River, Klein River (near Hankey), and the Zuurberg, which had better be all sold at once to relieve the revenue of the expense of their conservation (£215 per annum), to which they contribute collectively but about £80. These forests, with the Government reserve attached to them, would, no doubt, realise a fair price, chiefly or the quantities of firewood they contain, and the value of the open land for agricultural purposes, &c.

'As regards the large valuable forests extending from George

to the Zitzikamma River, to offer them for sale in small lots would, we opine, be their utter ruin. This plan has already been tried, and found highly injurious to the Government interests. For instance, the purchaser of an intermediate lot of forest can cut in the forest adjoining with impunity, and little fear of detection. Boundary lines in a dense forest are not defined without great trouble and expense—an expense never yet authorised. Thus the purchaser of one lot virtually becomes the proprietor of two or three. Moreover, the purchasers of small lots are wood-cutters, who, in lieu of being their own conservators, as would be the case with a large owner, clear their forests of all valuable timber, and eventually convert them into gardens. When it is thought desirable to offer these forest lands for sale, we would recommend their being divided into farms of fifteen hundred to two thousand morgen, to ensure their falling into the hands of intelligent men, who would work their forest with advantage to themselves, as well as preserve them from unnecessary destruction. The large forest proprietors of the Knysna are, we believe, only awaiting the inauguration of a better system of conservation to support that system, in lieu of setting up an opposition, as is generally imagined.

'"2nd. The establishment of an intelligent system of conservation, under which the forest may not only be preserved, but restored and enlarged."

'That the present system, as carried on at George and the Knysna, is defective in the extreme, the evidence given before us at both these places will substantiate; and it is but too apparent that the sweeping assertion of Mr Darnell, "that the so-called conservation at George and the Knysna is a perfect farce," is but too true. We should, however, remark that it appears to have been a mistake to combine the offices of Civil Commissioner and Conservator of forests. The first and most important brings its own work, and leaves little time for conservation duties which require one man's time and energy.

'At George (*vide* evidence) it appears that the Conservator has visited the forests and the ranger of ward No. 2 but once during a period of three years, and that only once since a

recent discovery of extensive timber thefts. Ward No. 1 has been visited occasionally. Irregularities have crept in which custom have made right, till a gross case lately occurred, when, however, the offending parties were acquitted, at the recommendation of the judge, mainly owing to the careless manner in which the forest duties were carried on. The revenue of these forests for last year was £90, but has considerably increased since the discovery of the late timber robbery.

'The ranger of ward No. 1 is also the linesman to the Telegraph Company, whose duty it is to travel along his beat (about 40 miles long) once a week. If he does his duty to the Telegraph Company, it is to be presumed that he neglects his duty to the Government. The ranger for ward No. 2 is suspended, awaiting His Excellency the Governor's decision as to his conduct in the late case of robbery.

'At the Knysna the Conservator paid his first visit to ward 1, during during a period of five years of office, a few days before our arrival. The other wards have been visited but twice or three times during the same period in his capacity as Conservator. He kept no horses, but supplied himself with one two or three days prior to our investigation.

'The ranger of ward No. 2 is an old public servant, is a cripple, and has no forage allowance, though his ward is quite as extensive as ward No. 3, the ranger of which receives a higher salary, and forage as well. The wife of the ranger of ward No. 3 is a part proprietor of a private forest in full working!

'In the Zitzikamma the forests are worked systematically in sections. The wood-cutters are concentrated at the wood station. The ranger (there is only one—the Conservator acts for one ward) resides near the station, and has all the men and work under his eye. The Conservator, by frequent visits, sees that his orders are strictly carried out, and is zealously assisted by the ranger in every measure for the better conservation of the forests.

'The system of conservation we would suggest to be adopted is based on that introduced by the Conservator of Uitenhage in the Zitzikamma two years ago, and recommended by Dr.

White in Parliament. It appears to us best suited to the wants of the wood-cutters and the public.

'Coupled with the preservation and restoration of the forests, we would gladly advocate a system by which the forests could be enlarged as well, but the employment of labourers at high wages would entail a heavier outlay than, we presume, Parliament would be inclined to sanction. However, we hopefully look to the future for an increased revenue from this source to carry out plantations, &c.

'Let the forests of George and Knysna be worked in sections, *and in the season only*. May, June, July, and August, appear suited to the most useful woods. As one section is worked out, move on to another, leaving the old one to recover itself, and so on till the whole extent of forests has been worked in rotation. Stations for working should be decided on by the Conservator, and there concentrate the wood-cutters. A ranger should reside near the work-station, whose duty should be during the close season to select and mark trees for felling, and in the cutting season to accompany and point out to the wood-cutters the trees to be cut. To remedy the present waste in long ends, the license should be made for cubic feet, and not for twenty feet planks as now; a tree once felled must be all worked up. At the Knysna two rangers will be required—one to overlook the working parties, and the other to ride round and protect the extensive closed forests. In the other forests one ranger will be sufficient; but it must be understood that the whole service of the rangers must be devoted to the Government, and, moreover, that they would be required to live at the forests, wherever the Conservator may deem best to put them.

'We would recommend that the officers be better paid, but reduced in number; their duties will be heavier and more constant. In fact, a forest ranger, like a constable, should be always on duty. To carry out this system we estimate the staff as—

The Conservator	£400
Forage allowance, 3 horses	75
1st ranger (Knysna)	100
Forage allowance, 1 horse	25

2nd ranger	£80
Zitzikamma ranger	150
Forage allowance for 1 horse	25
George ranger...	100
Forage for 1 horse	25

'The present insufficient system costs £1,400 a year. Thus a saving of upwards of £400 a year would be effected, and a sound system of conservation would be established, whilst we feel confident the revenue would be increased.

'The residence of the Conservator should be at the Knysna, as being the most important as well as the most central forest; and an intelligent ranger at the Zitzikamma, whose salary we have estimated at £150 a year, could carry on the work as now established, as well as protect the closed forests; a quarterly visit from the Conservator would be sufficient there. The new road from the Knysna to the interior brings it within sixteen hours by post cart. We would, however, suggest that the license fee be reduced to one pound (£1), not that we believe in the prophecies of the wood-cutters, but as an act of expediency: the proprietors of private forests have already done so. The present forest regulations will require some slight alterations to meet these changes. We would recommend, further, that the amended regulations should be published in the form of a Proclamation, in lieu of a Government Notice, so that offenders could be brought within the jurisdiction of a magistrate, and the substitution of this Proclamation for the present "Forest and Herbage Act," which defeats its object by its severity.

"3rd. The laying out in suitable localities of villages, in erven of not less than two acres each, to be granted on a small quit-rent to wood-cutters now squatting in the forests."

'This will be a highly judicious and beneficial measure, if the forests be worked four months in the year only. The wood-cutters must seek some other means of subsistence during the remainder, and we cannot do better than stimulate them to some useful occupation. There are sites for villages, as proposed, available in each of the forests under consideration. In the Knysna three might be established.

'1st. At the Poort, midway between Plettenberg Bay and the Knysna, where some erven have already been sold, and where there is abundance of water and good soil.

'2nd. At Krantzbosch, at the N.E. side of the large forest, where several wood-cutters are now squatting, and have built houses and made gardens.

'3rd. At Yzernek, on the main road from the Knysna to the interior, where a village has been laid out by the Government for the purpose.

'In the George forest, one on the western bank of Houge Kraal River, which is close to the forest now being worked.

'In the Zitzikamma forest, one on the Foure River.

'By steady work during the cutting season, the wood-cutters could collect sufficient timber to supply their wants till their crops were ripe, and such a system would encourage, indeed necessitate, habits of industry and economy, to which this class has ever been averse. The erven should be let at a small annual quit-rent, for a term of about thirty (30) years, on condition of erecting a cottage and tilling the land alloted to each head of a family. A general superintendence over these villages might be exercised by the Conservator, and any flagrant breach of the law should, on conviction, subject the offending party to a forfeiture of his erf.

'"4th. The completion of a road along the coast from George to Humansdorp, through the whole length of the forest, in order to open up the whole country thoroughly, upon the making of which road destitute wood-cutters and others may find employment at a moderate rate of wages."

'By the aid of Captain Bailey's survey, fixing the most conspicuous peaks on the Lange Kloof range, and a few prominent points on the coast, we were much assisted in making our survey of the unexplored tract of country, the plan of which will be forwarded as soon as it is completed.

'With regard to the road, we are of opinion that the advantage which will accrue to the Government by its construction will more than compensate for the cost of its outlay, of which an estimate is annexed. The distance saved over that of the

Lange Kloof road is about ten miles, and it will open up about three hundred and fifty square miles of fine Crown land, upon which there are extensive forests of magnificent timber, and large open flats of excellent soil, capable of being cultivated and irrigated to a great extent from the Coldstream, Harison's, Duthie's, Jerling's, Witklip, and Sanddrift Rivers, which are fine permanent streams, running at high levels, with low banks, and emptying themselves into the sea by a series of cascades,—a feature so different from the characteristic of the Knysna rivers, which invariably have very high, precipitous approaches, and very little fall between the sources and their mouths, thus rendering them almost useless for irrigation purposes. By the aid of these streams most of the timber could be worked by means of saw-mills and other machinery, which ought to add to the value of those particular localities. The road will, moreover, open up two seaports—Knysna and Plettenberg Bay, both places which must eventually become important from their central positions and many natural resources. The grazing on this line will be superior to that of the other, which is always a consideration with carriers in their prices of transport.

'The tract of country lying between Forest Range and Lange Kloof Mountains is more adapted for cattle farming, being abundantly supplied with good grass and water from the Palmiet River.

'The road in general will not be difficult to construct. From this to the Knysna the line is already in the course of construction, and has been fully reported upon on a previous occasion. From Knysna to the Bito River, near Plettenberg Bay, there is a tolerably good road, which has been much improved by the Divisional Council of late. There are several drifts at the Bito, but the upper one is the best, being passable at all tides. Thence to the Keurboom River, the road will need a little improving, and a slight deviation will be necessary to cross the river higher up by means of a pontoon, and thus avoiding the spruit or branch of the Keurboom, which, together with that river, form a sheet of water of about 300 yards wide, and from 8 to 10 feet deep at dead low water. The Klip Hill,

on the east side of the river, is a miserable piece of road, and can be much improved by carrying the line as shown on plan. Thence to Salt River is a good natural road. Thence, eastwards, there is a patch of forest where the line requires widening and a little improving. The Salt River is navigable for a short distance up for small craft of about thirty tons, and might be turned to good account as a place for shipping timber. Thence to the western bluff of the Groot River there is a good natural road. The slope down to the Groot River will necessitate rather a heavy gradient of about 1 in 12, but on the eastern ascent the gradient is easy, and the line will open up some fine forest. There is a good drift for a crossing over the river. Thence the line will pass through a jungle ("Fyn Bosch") to Bluekrantz River, which is, however, no obstacle to road-making, as it can be easily burnt away. The Bluekrantz River is the greatest barrier on the whole line. There is only one place where this river can be crossed, on account of its very precipitous approaches. Its western slope will likewise necessitate a gradient of 1 in 12, but the eastern one is very easy. There will be a good deal of blasting and heavy escarpment in this crossing, but no bridging will be required, as there is a good drift. Thence to the Storm River the line will pass over a very flat country (now mostly jungle), and will cross the rivers—Coldstream, Harison's, Duthie's, and Jerling's—by good drifts, which, as already mentioned, form no barriers to road-making, as they have such low banks. The Storm River can be crossed in two ways, as shown on plan, but the lower line, although somewhat the steepest, is the best and most direct. From Storm River to Humansdorp there a tolerably good road, which the divisional council used to keep in order, but it is now much neglected.

'We would recommend the road to be constructed by convict labour, as wood-cutters, from the evidence we have taken, object to work of this nature. To carry this out with economy and dispatch, we would propose to place about 350 men under one staff of officers, stationed in the following manner: Main station, on western side of Bluekrantz River, for 160 men;

one out-station for 70 men at Groot River; one for 40 men at Keurboom's River; and one at Storm River for 80 men—thus embracing all the work that would have to be done, and which would take the above number of convicts about three years to complete. The pontoon at Keurboom's River could be made of good stinkwood for £250; to which must be added the usual average of about £800 per annum for plant, gunpowder, and working expenses for the above gang.

'"5th. The expenses of the road to be defrayed by the sale of forest lots."

'We are of opinion that the amount realised by the sale of forests recommended for this purpose will be sufficient to meet the expenditure.

'No. 6th has already been dealt with under Question No. 2 (Zitzikamma), and we strongly recommend its general adoption.

'In conclusion, we beg to draw attention to the practice of honey-hunting, which is extensively carried on, to the detriment of the forest, and the annoyance of the farmers, and should, we think, be checked by the granting of licenses for this purpose, on certain conditions, by which means the licensee would, in guarding his own interests, prevent the wandering hunter from encroaching on the forests for which his license holds good, and thus bring the evil within certain bounds The damage done is not so great as is generally imagined, but the fact that the trees are felled in the Crown forests for this purpose, without authority, demands attention.

'The large game—elephants and buffaloes—will soon disappear, unless protected by stringent laws. The Conservator at the Zitzikamma has effectually prevented their destruction from his side, but it is generally reported that hunting parties from the interior enter the recently explored forests from the Lange Kloof side, and destroy much game. Mr Newdigate, J.P., of Forest Hall, has kindly offered his services to protect the game from the Knysna side, provided he be authorised to do so —an offer we would recommend the Government to accept.

'The suggestion of the Conservator for Uitenhage as to veldt-burning, contained in his report for 1867, is supported by the

evidence of more experienced men. The forest country is covered with a dense mass of jungle ("Fyn Bosch,") useless alike to man and beast. It can only be got rid of by burning, which, if done after heavy rains, and with favourable winds, can do no injury to the forests. The practice should, however, be restricted to authorised parties, and carried on systematically every year.

'We have, &c.,

C. HARISON, } Forest
THOS. BAIN, } Commissioners.'

'This report, with copies of the evidence collected by them, was in due course presented to Parliament; and in the session of the following year, in the Legislative Council, the President moved, as an unopposed motion, that a Committee be appointed to take into consideration the report of the Commission appointed by His Excellency the Governor in regard to the Crown forests, which was presented to this Council in the year 1868, with the view of ascertaining whether any and what steps have been taken to carry into effect the recommendations of that report, with power to call for letters and papers.'

CHAPTER VI.

LATTER ADMINISTRATION OF THE CROWN FORESTS UNDER THE OLD REGIME.

THE report of the Commission to inquire into matters connected with the working, &c., of the Crown forests, appointed in pursuance of an address from the House of Assembly, dated 11th December, 1866, was made under date of 4th May, 1868, and in 1869 the Legislative Assembly resolved to inquire whether any and what steps had been taken to carry into effect the recommendations of that report. With what results this was followed I have not learned. But under date of 13th June, 1871, there was issued a Government notice, No. 204, relative to the management of the forests. This was formally cancelled by a subsequent Government notice, No. 361, issued on 12th August of that year—1871. I have not seen it; I can only surmise what the substance of it was from what has been reported of operations and results obtained while it was in force.

I find it reported in the year following—1872—that the expenditure for conservation in the Uitenhage district exceeded the revenue derived from license fees and the sale of waste wood by £177. But it may be noted that at that time the Van Staden and Klein River bushes were being surveyed for sale, and an allowance was being made temporarily to the ranger in charge, though no revenue was obtained. Changes were made in the staff of officials at the Knysna. There was an increase in the revenue produced by licenses to fell timber of £340 over what had been received in the preceeding year; the amount received being £719 6s 6d. The Conservator reported,—'I have every reason to believe that there will be a considerable increase this year in the revenue derived from this source, owing to the increased demand for timber, and proprietors of private forests being unable to supply the demand; besides several of these having been completely destroyed by the great fire of February, 1869.'

The revenue this year exceeded the expenditure by £299 19s 10d. But this did not make up the loss which had been incurred in preceeding years, the revenue derived from license fees in this and the preceding six years—*i.e.*, 1861-1872 inclusive—amounted to £2137 17s 8d; but the cost of conservation during that time was £2987 6s 8d, showing a deficiency of £813 9s.

The Conservator of forests in George reported,—'The amount of £185 was here realised for timber during the past year against £132 for the previous year—1871, and £82 for 1870, thus showing a steady increase under this head.' But the expenditure was not reported.

The Conservator at George, while reporting 'the partial opening up of the new line of road between George and the Knysna, has tended to some extent towards the increase of licenses, and I have every reason to believe that when this line of road is fully completed to the Knysna the demand for licenses will increase in consequence of the additional facilities that will be afforded thereby', states—'If it were not for the private forests in this and the adjoining division of Knysna, which are kept open during the whole year, the revenue from this source would be considerably greater.' From this I gather that the felling of timber had been restricted to specified seasons, and to this I find also an apparent reference in the following statement in the report:—

'The regulations for the conservation of the forests have been strictly acted up to, and no cases of theft have been reported. The system of allowing a few industrious woodcutters to squat in the Government land adjacent to the forests, under certain restrictions, works well. These men, during the period when the forests are closed, occupy a portion of their time in cultivating the ground, and have raised very good crops, and are now in a better position than they were a few years back.'

By Captain Harison, the Conservator at the Zitzikamma, it was reported:—'The new regulations came into force this year, and though introduced without the extra supervision for which I stipulated, have been carried out as strictly as circum-

stances would allow; their chief end—prevention of waste—has been gained, as the presence of the rangers in the forests to supervise the felling has put a stop to the habit of reckless chopping and hewing so prevalent amongst the wood-cutters.' And again he reports,—'The work at Olifant's Hoek has been confined chiefly to the supply of sneezewood for the Port Elizabeth and Uitanhage Railway, of which fifty-six loads have been delivered. The ranger has evidently enforced the new regulations, for on my inspection of the forests I found little or no useful timber left to waste.'

By the Conservator of forests at George, the increased sale was attributed to some extent to the opening up of a new line of road between George and Knysna; and the importance of exploiting the forests in sections, to some extent in accordance with the old French method of exploitation, known as *La Methode à Tire et Aire*, introduced into the Colony by Captain Harison, recommended by Dr Whyte to the consideration of Parliament, and recommended by the Commission appointed by the Government in 1867, was beginning to be more fully recognised, and the formation of a waggon road through the Storm River had been begun. To both measures is a reference made in the following statements in the report of Captain Harison:—

'For six years the Zitzikamma has been worked in sections, but unless the Government will assist the wood-cutters in making a waggon road through the Storms River, the section system will have to be abandoned. This river, with its almost perpendicular banks of about 200 feet high, with six miles of forest on its western bank, presents difficulties which deter the pluckiest wood-cutters from attempting with a waggon. Hitherto the logs, and in some cases planks, have been slipped through, but the frequent accidents to man and beast have thoroughly frightened the people; and as they decline to advance further into the forest, I cannot open a new section for work.

'I would beg to impress on the Government the expediency of making this road. Not only will it benefit the forests, but it will be the means of opening up an area of about eighty

miles of the finest forest and grass country in the Colony, and moreover form a commencement of the proposed coast road to Knysna.'

With regard to the closing of the forests, and disposing of lots by sale, Mr Rex, the new Conservator at the Knysna, who had been well acquainted with the forests of the district, and taking an interest in them, as his father had previously done, reported:—'I think it was a mistake disposing of any of the forest lots, particularly when there are no natural boundaries, as it makes conservation unsatisfactory, it being a very difficult matter to detect and prove trespass.' And he goes on to say,—'I would most respectfully suggest that with the assistance of the revenue derived from these forests, the boundaries of lots already sold be pointed out by a professional man. This would prevent the present difficulty, and clear up any doubt as to where the exact boundary lines are, which are at all times difficult to find in a forest.'

The Civil Commissioner of the district, who had been Acting Conservator of the forests in view of the same evil, while anticipating, as did Mr Rex, an increased sale of timber, threw out a suggestion apparently inconsistent with views expressed by Mr Rex, but not so in reality. He says:—'It is probable that a further increase in the revenue derived from this source may take place during the current year; but I would nevertheless strongly recommend the sale of all forest lots, more especially those lots adjacent to, and through which the main line of road from this to the Lange Kloof runs, and those annexed to private forest lots.'

On a subject somewhat akin to this, but essentially different, Mr Fichat, the Civil Commissioner, and Conservator of forests in the district of George, who had also long been interested in the forests, reported:—'With reference to the entire closing or disposing of the forests in this division I shall gladly afford every information when required so to do. I may, however, here add that if it is intended to lease any forest lots that I consider such a step would be detrimental to the interests of the Government, for I believe no conditions would prevent a

lessee from cutting timber, and consequently such lots would be deteriorated in value.'

A still more comprehensive view of the matter is embodied in the following statement by Captain Harison, who had been for many years Conservator of forests in the Zitzikamma, and whose professional skill, and zeal, and labour there has long been my admiration :—

'As the forest question is likely to occupy the attention of the Government and Legislature ere long, I venture to give my views on the subject. If *revenue* be the *sole* object desired, then reduce the expenditure to the lowest, remove all restrictions on the wood-cutters, open the forests all the year round; and our forests will disappear in proportion as the revenue derived from them increases.

'If the sale of the forests be contemplated, let me assure the Government that they will realise nothing in proportion to their value. Let any one explore the unoccupied country between the Storms River (Zitzikamma) and the Salt River (Knysna), and judge of the magnificent forests and luxuriant soil which it is proposed to sell for a few shillings per acre.

'On the other hand, if the preservation of the forests be decided on, then let me respectfully urge on the Government the necessity of establishing some system of conservation more in keeping with that of Germany, France, and India.

'Our present position is this :—The Zitzikamma forest is scattered over an area of about 200 miles, and is supervised by the Conservator and one ranger. Olifant's Hoek is under one ranger, and extends over about seventy miles, is intersected by private forests and farms, with boundary lines cutting through the dense forest. Is it possible for me to affirm there is no smuggling going on?

'Our forests are being mined as it were—protected to a certain extent, but not enlarged or improved. Because they don't pay, our truly magnificent forests are set down as valueless. There is timber in the Zitzikamma alone sufficient to meet all the demands for railways and bridges, &c., for years to come. Surely such a valuable property is worthy of more consideration. We cut down, but we never replace. True, that

nature does much for us (especially along the coast line), but how much more might be done if man were to assist nature with all the science that the German and French schools have brought to bear on this subject.

'"Forestry" is entirely forgotten in our catalogue of wants, and I venture to bring the subject to the notice of Government that whilst railways and bridges occupy so important a position, one of the most necessary elements in their construction may not be lost sight of—viz., timber.'

The data yielded by the report of 1873 did not prove more satisfactory. The revenue of the Knysna forests for the years 1866-1872 inclusive, showing a deficit, when compared with the expenditure, for conservation of £813 9s, an average deficit of £116 4s 1½d per annum. The forests of Zitzikamma showing that year a deficit of £177 as a like comparison.

Meanwhile there had been a great destruction of forests by fire in February, 1869, when a tract of country 400 miles long, and varying in breadth from 15 to 150 miles, was desolated by a fire unparalleled in the history of the Colony. It is referred to by the Conservator of forests at the Knysna, and details are cited by me in a volume entitled *Hydrology of South Africa* (pp. 178-193); and there had been a continuous destruction of forests by wood-cutters, of the results of which I have given detailed illustration in the same volume (pp. 171-175.)

In the course of the year 1872 responsible Government was introduced at the Cape, and with changes connected with this the administration of the forests was committed to the Commission of Crown Lands and Public Works, and some three years thereafter there were issued the following Government Notice and Regulations:—

'GOVERNMENT NOTICE.—No. 361, 1875.

Office of the Commissioner of Crown Lands and Public Works, Cape of Good Hope.

2nd August, 1875.

'The following Regulations for the Crown forests of Knysna,

George, Zitzikamma, Uitenhage, Olifant's Hoek (Alexandria), King William's Town, Victoria (East), and Stockenstrom, have been duly approved of by the Government, and are published for general information. These shall take the place of all existing regulations,* which are hereby cancelled.

JOHN X. MERRIMAN,
Commissioner.

Regulations.

'1. The Crown forests shall be open to the public throughout the whole of each year, provided that licenses shall be issued to fell only the descriptions of timber, which are known by the officers in charge of the forests, to be in season at the time when applied for, and no other.

'2. The following shall be the rates of charges for licenses to cut timber and wood in the several forests above-mentioned, viz. :—

'(*a*) In the forests of George and Knysna—For a load of timber, £1 10s; spars, 10s; firewood, 5s.

'(*b*) In the forests of Zitzikamma, Uitenhage, and Olifant's Hoek– For a load of timber, £1; spars, 10s; firewood, 5s.

'(*c*) In the forests of Stockenstrom—For a load of timber, £1; spars, or slabs, 10s; firewood, 2s 6d; for disselbooms, each, 1s.

'(*d*) In the forests of King William's Town, and Victoria (East)—For waggon wood, sound, per cubic foot, 7d; dry, 6d; yellowwood, sound, 5d; dry, 4d; sneezewood, sound, 7d; poles of waggon wood, per running foot, 1½d; poles of yellowwood, 1d; poles of sneezewood, per running foot, 2d; disselbooms, each, 1s 6d; spars, per load, 10s; firewood, per waggon load, 5s; firewood, per load of German vehicle, 2s 6d; wood for one hut, 7s 6d; wood for one kraal, 15s; license for firewood for a period of three months, to be paid by person in charge of a waggon employed in the forest, £3; license for same period to be paid by person in charge of a German vehicle, £1 10s.

* Including Government Notice, No. 204 of 13th June, 1871.

'3. A license to cut firewood or spars shall hold good for a period of two days. No yellowwood, stinkwood, assagai, witte els, saffron, essenwood, ironwood, witte pear, red els, or red pear, shall be cut for spars or firewood.

'4. The license fee shall in every case be paid before the license is issued.

'5. A load of wood shall consist of the following quantities:—

In the case of waggon wood, two complete loops of wood, or four loops of "Onderstel."

In the case of	Yellowwood,	100	cubic feet.
Do.	Stinkwood,	60	do.
Do.	Sneezewood,	60	do.
Do.	Witte els,	80	do.
Do.	Essenwood,	60	do.

'6. Every license must specify the part or ward of the forest in which the holder is to obtain the timber, and the number of men intended to be employed in cutting the quantity specified; and the license shall hold good only in and for that particular portion or ward of the forest.

'7. Licenses to cut timber in any Crown forests shall be obtainable at the office of the Conservator of that forest, should such an officer have been appointed, and of such Civil Commissioners or forest rangers as may be authorised to issue them. In the case of licenses to fell timber being required in divisions where no rangers have been appointed, the Civil Commissioner of such division shall be authorised to issue them.

'8. When a license has been obtained to cut timber in any part or ward of a Crown forest it must be presented to the ranger or other proper officer of that portion or ward previously to any wood being cut, on pain of forfeiture of the license, and any other penalty which may be imposed for breach of these regulations. The ranger or other officer aforesaid will then, unless the license had been issued by himself, register and endorse the same, and will in any case return it to the holder who will then be at liberty to cut the wood specified in his license on the spot pointed out by the ranger.

'*9. No timber shall be removed from the place where it has been felled without having been previously inspected, measured, and marked by the ranger or other proper officer, who will note the amount of the timber, and date of inspection, on the back of the license, or in his Register Book. The measurement must include the whole length of the tree suitable for timber. Whatever timber is left lying in the forest after such measurement shall be the loss of the wood-cutter, and shall be reckoned in the quantity allowed by the licen se to be removed precisely as if the same had been taken away.

'*10. When, after measurement in the forest, the timber has been removed to the saw-pit or work station, it shall be there again inspected by the ranger, or other proper officer, so as to compare the quantity brought out of the forest with the quantity felled, as noted on the license or in the register. Any difference between the two measureme nts shall be noted on the back of the license. The ranger, or other proper officer, shall then again stamp or mark the timber in such a manner that when the logs are sawn into planks the stamp shall appear upon each.

'11. After the final inspection, the wood-cutter will be at liberty to remove his timber either in block or plank; if in the latter form, six clear days will be allowed for sawing a load of wood; twelve clear days will be allowed for preparing a load of waggon-wood. Should the wood-cutter intend to take out more licenses, and wish to defer the sawing until after the felling season is over, he must collect the blocks together in one spot, with the ranger's mark clearly visible.

'12. Each holder of a license to cut one load of wood will be entitled to take sixteen oxen to the forest, and to graze them on the adjacent Government ground or other lands under servitude of grazing the wood-cutter's cattle, for fourteen days, after which period oxen must be removed from the grazing ground till the wood be ready for removal. This regulation will be relaxed only

* NOTE.—In cases in which, owing to local circumstances, the regulations 9 and 10 are found to be inapplicable, the Conservator or other local officer will be authorised to dispense with the same, and to substitute therefor such other suitable regulations as will best accomplish the object in view.

in case it shall be proved that the men have been prevented from working by sickness, accident, or bad weather.

'13. Any holder of a license contravening any of these regulations shall forfeit his license and all wood felled, and not removed at the time of such forfeiture.

'14. FORM OF LICENSE.

'Crown Forests ——— License to cut Timber.

'Permission is hereby given to to cut load of wood from Ward

'Number of men employed by for this purpose,

'Number of oxen to be taken to the forest.

'This license is to be presented to the ranger, or other proper officer of Ward , who will register it. The license will then be in force for eight clear days (if for one load) for felling and moving to the saw-pit or work-station; six days additional being allowed for sawing, and twelve days for preparing a load of waggon-wood. Provided that in case it shall be proved that the men have been prevented from working by sickness, accident, or bad weather, an extension of time may be granted, not exceeding ten additional days, at the discretion of the Conservator, or ranger, or other proper officer.

'15. Any breach of the forest regulations by the holder of this license, or his party, will subject him to the forfeiture of the license, and of the wood felled or prepared.

'(Signed) A. B.

'Dated

'To the Ranger of Ward.'

From the financial reports of 1876 it appears that in that year the amount received for license fees in the Crown forests of George, the Knysna, and Zitzikamma, was £471 more than the expenditure for conservation; that there had been issued thirty-one free licenses to fell trees for telegraph poles, and forty-seven free licenses to fell for other public works. But while £1910 14s was the amount of licensed fees, the estimated value of the wood removed, particulars of which were given, was £14,338! In the same year the revenue derived from the

forests in the division of King William's Town exceeded the expenditure for conservation by £547; but the value of the timber was £916 17s 11d. In Victoria (East) the excess was £99 18s 2d. In Stockenstrom, for five months ending 31st December, it was £63 10s.

In other forests the expenditure for conservation was in excess of the revenue:—

In Olifant's Hoek and Zuurberg,	£60 12 0
In district of Bathurst,	9 11 2
In division of Clanwilliam,	11 10 0

The fact is noteworthy; but it does not by itself supply any evidence of bad economy.

In 1875 the revenue from Crown forests was	£2696 6 11
Expenditure,	1833 12 6
Nett proceeds,	£862 14 5
In 1876 the revenue was	£3406 1 10
Expenditure,	2666 7 9
Nett proceeds,	£839 14 10

This fact also is noteworthy; but it does not of itself supply evidence of good economy. For the fact that while the free proceeds amounted to a great deal less than £1000, the estimated value of the wood removed from the forests of the Knysna, George, and Zitzikamma alone amounted to £14,388, is suggestive of serious consideration. If all revenue derived from fees for licenses to fell timber had been obtained at a like expense, with such a waste of wood and devastation of forests as has been indicated, taking place under what is designated the Conservation of the Forests, there must have been something defective in the conservation and exploitation followed; nor to any one conversant with the modern forest economy of Continental Europe will it be surprising that the results should have been so unsatisfactory.

PART II.

FORESTRY UNDER THE NEW REGIME AT THE CAPE OF GOOD HOPE.

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CHAPTER I.

PRELIMINARY PROCEEDINGS.

THE old regime of Forestry at the Cape of Good Hope was nominally that of Forest Conservation. I have supplied facts which will enable any one to form an opinion for himself of the measure of efficiency with which this was accomplished. The new regime of Forestry at the Cape is that of Exploitation in accordance with the advanced forest science of the day.

The term *exploitation*, in its application to Forestry, is technically employed as descriptive of the felling, roughly dressing, and bringing out from the forest of forest produce; but like the corresponding term so employed in Britain, the phrase *working the forest*, it is sometimes used with a laxer application which seems to embrace not a little besides, which relates to the turning to pecuniary account the products of the forest.

While I was in the Colony I met with more than one who deplored the failure of the Government to secure the professed aim of all their endeavours in this department—the conservation of the Crown forests,—and who were most desirous that these could be brought under the administration and management of professional foresters, instructed in the advanced forest science and economy of the day. Prominent among these were the late Mr. Von Alphen, C.E. at George; and Captain Harison, then Conservator of the Crown forests at the Zitzikamma,—

both of them gentlemen personally doing, and prepared to do all that they could to secure in the interest of the Colony a satisfactory treatment of the forests in question.

So far as is known to me, Captain Harison was the first to bring the matter under the attention of the Government. In correspondence, to which reference has previously been made, and which he showed to me, prominence is given to the fact that in the forest districts of Germany the system of forest science is carried to such perfection, and the management of forests in the course of centuries has received such attention, that the books published on the subject fill a thick volume, while forest science, forest economy, and forest law, have each their chairs at the various universities; and that the systems of management vary according to locality, soil, and drainage.

The Hon. Mr Field, who was, I believe, at that time Collector of Customs, was authorised to write to Mr Mosenthal, a merchant resident at the Cape, who happened to be then in Europe, requesting him to make certain enquiries in regard to the practicability of getting some trained and educated foresters from Germany to undertake the management of the Crown forests of the Colony. In reply, Mr. Mosenthal wrote:—'With regard to the possibility of securing the services of German foresters, Baron Schott Von Schottenstein, Professor of Political Economy at the University of Tubingen, writes:—"There will be no difficulty to obtain for you two or more foresters for the Colony. They may engage for five years, and may best be procured from the Grand-Duchy of Hesse, from its having a good Forest School, and its counting the years employed in forest service as so much preparation for promotion at home. Your Government will have to state the amount of salary they are prepared to pay, and must pay, for the passage out and home. From the salary spent will depend the experience to be got: for ordinary overseer purposes, ordinary men (perhaps those who have just finished their forest education) may suffice; but to introduce systems in new countries you will require men of experience. Few of our foresters—I believe none—have had occasion and time to study English; therefore a year or more after their arrival in the Colony must necessarily elapse before

they can have made themselves acquainted with the language spoken, and with the conditions and requirements of the woods which shall be placed under their management, and with the soil, the climate, and the drainage of the country. From the nature of the Knysna forests, as described by you, and from the state of absolute infancy in which forest cultivation seems to be in your country, I conclude that *a vast field* for improvement opens up to the forester: as also, indeed, an important subject may be that of wooding sandy plains, and protecting drifts and valleys by the introduction of systematic plantations of shrubs and bushes, &c., &c., such as we have in the Spessart and Tanner's Valleys.

'"Students of forest economy come to us from all parts of the world, from Great Britain, Spain, North and South America, from Sweden, from Norway, and from Russia. They have to study this special subject for two years and-a-half, and they are after that time practically employed for twelve months in the forests of the Crown. Aschaffenburg in Bavaria, and Carlsruhe in Baden, are considered excellent forest schools; but the *application* of forest science being an economy requiring long local knowledge, I would prefer your advising the Government *to establish a forest school in the Colony*, in the district where the best and most productive forests are situated, and under the guidance of several picked men from Europe, in order to train as theoretical and practical foresters young men born in the Colony, acquainted from childhood with local matters, climate, language, history, and geography; following their pursuits in the land of their nativity, and so transmitting from generation to generation such local experience of the forest and of the soil as they will gather on the spot. These young men ought to have had a thorough classical and general education, and ought to have had instruction in the rudiments of law and botany when they enter the forest college. Home men I consider essential to forest cultivation; for forest life is one of much loneliness. Forests form, as it were, a part of the history of a country; and without recollections, associations, and family ties to keep him, a stranger will soon become tired of your woods, and thus you will be forced to recur continually to new comers,

and a branch of economy must consequently remain dormant which otherwise might materially assist the development of the natural resources of a country."'

It has been mentioned in the preceding part of the volume, that in 1864 a copy of my Memoir on the Conservation and Extension of Forests in the Colony, appended to the Report of the Colonial Botanist, was, at my instance, sent from the Colonial Office, with a series of queries prepared by me, and addressed to gentlemen in different parts of the Colony known to take an interest in the conservation and exploitation of the Crown forests.

The late Mr. Von Alphen, C.E., George, in forwarding his reply to the Colonial Secretary, wrote:—'I beg to express my belief that Government forests of the magnitude and importance of those situated in this Colony can never become a source of permanent revenue, nor be successfully worked and properly protected, unless those in charge of them have obtained the necessary education for the performance of their duties. Perhaps some such system of training for the office of forester should be established as those existing in France and Germany, and which have proved so successful. By the establishment of such forest schools, not only were the forests of those countries saved from utter ruin, but they became, through the application of forest science to forest culture, a source of wealth in constant flow, as long as they are kept in order and worked properly. The indirect advantage of an academy where science of the highest order and manly sports are taught, may, although not bearing entirely on the subject now treated, prove of no small importance; and the more for this reason, that forest culture is so closely allied to agriculture, and an experimental farm and nursery in the neighbourhood of the forest might be perhaps the best inducement to farmers to send their sons for education to such places.

'The answers which I have the honour to send to the queries contained in the circular, although they may be of little importance, are made to bear on the above-mentioned principle, viz.: that only a forest academy (without fixing on the manner of application) will make the forests remunerative.

'What the science of forests embraces may be seen in the different books treating of this study. In the German schools it is divided into—(1*st*) The knowledge of forest culture; or the growth and cutting of trees; (2*nd*) The preservation of forests; (3*rd*) The use of forest timber, and its technology; or treatment and improvement of timber; (4*th*) The valuation and the working of forests; (5*th*) The husbandry of forests; and (6*th*) The history and literature of forests, botany, zoology, and surveying, are also taught, and the most manly sports are the recreations of such institutions.'

Looking at the subject from the stand-point which is thus indicated, he wrote, in reply to the first of the queries issued: *To what extent are your observations in accordance with those of the Colonial Botanist?*—'It seems to me that what is suggested by the Colonial Botanist is good; and this especially, if the proposed measures be adopted in such a way as to lead ultimately to the establishment of a Forest Academy. I should like to go further than is suggested by him in regard to the erection of saw-mills. The employment, under the direction of a mechanical engineer, of machinery required for the manufacture of wooden articles now imported, would teach the population what could be made out of the forests. This, however, should not be done until every sort of wood yielded by the forests has been reported on by competent persons in England, as I have recommended in answer to another query.' And in answering the second query, What is your opinion in regard to the practicability and expediency of carrying out any or all of the suggestions the Colonial Botanist has made? he wrote:—'To secure probable success, the course I would recommend would be the following: –

'1. Select a part of sound forest as a place for required experiments.

'2. Cut alleys and *slid-pads* on a principle to be adapted to the shape of the forest, &c.

'3. Establish log huts for guards.

'4. Have a nursery in the neighbourhood of the guards.

'5. Make a trial with the apparatus of Kean & Sons, for the extracting of roots of trees.*

'6. Have an experiment with a winch, to be made with alterations, for the purpose of removing trees felled. This is done in European forests.

'7. Select specimens as large as obtainable, and send them to England to be worked as described above; and do the same with woods for dyes, with mosses, &c.

'8. Have, as soon as the estimates of timbers has proved favourable, industrial schools provided, with machinery established, which can be made self-supporting, and become the possession of the tradesmen after having paid off the advanced capital and interest.

'9. Construct an arboricultural map of the Colony, shewing all differences in soil and water, and indicating what trees might grow on the different spots, &c.

'10. The map finished, have a nursery established with as many local, transition, or corresponding nurseries as may be deemed necessary, in order to send out of the large nursery cases of trees to spread over the Colony, through the small nurseries.

'11. Replant a part of ruined or exhausted forest.

'12. Arrange everything so that it may lead ultimately to the establishment of a Forest Academy.'

These suggestions, together with the letter to the Colonial Secretary by which they were accompanied, and which has been quoted above, I submitted to Captain Harison, who in returning them, replied:—'I have read with much pleasure the report of Mr. Alphen; his remarks are true, and his suggestions valuable. There can be no question that before attempting any system of planting one must have *experience*, which can only be gained by a few years attendance at a practical school

* The reference was to a simple and effective apparatus for blasting roots and stumps of trees, manufactured by Messrs Kean & Sons, Fishamble Street, Dublin. By means of it a large root may be split to pieces in eight minutes, by means of 5 oz. of gunpowder. The apparatus complete, with fusee and cartridges, costs £2, 10s.—J. C. B.

in Europe—and, from all accounts, I should select Germany as being the best, at all events the *cheapest.* Samples of Colonial timber should be sent home without delay; at present we are quite in the dark as to the value of our resources in this respect. A visit to the unsurveyed tracts between this and Plettenberg Bay will satisfy any one that if our forests are not sufficiently distributed there, at least we have an abundant supply of the finest grown timber ever seen. The question is how to dispose of it to the best advantage? If, as at present, our timber barely repays the wood-cutter, the sooner our indigenous trees are replaced by foreign the better. I find, on the other hand, Colonial timber can create a demand at home. Let us, by a carefully-devised forest system, husband our resources to the uttermost.'

After specifying to me one form in which waste—great waste—was occasioned in connection with the existing method of exploitation, he proceeds:—'To return to Mr. Alphen. In appointing the person for training as a forester, conservator, ranger, or whatever may be his future title, it will be necessary to secure his services for a *term of years,* and in that case a salary of at least £500 a-year, and allowances, must be attached to the office to induce a qualified forester to undertake the work.' In allusion to his deep conviction of the importance of the employment in the forests of a German from one of the forest schools, his strong feeling in favour of that being done, and his previous endeavours to secure this being done, he goes on to say:—'Though the subject was allowed to drop at the time, it is one which must claim a fair share of attention. As a commencement, the Zitzikamma forest might be extended over the hundreds of morgens of open ground which intervene between the patches of forest, by transplanting from the forest young trees, of which there are thousands of plants available, but which, from overcrowding, are now lost, or seldom arrive at maturity. The growth of our Colonial trees is slow, but (yellow-wood in particular) very sure. Two steady men, at £40 per annum each, could, with steady work, make a plantation of several thousand trees, seeing we have the plants at hand and land available.' And in answer to the queries issued at my instance

from the Colonial Office, he wrote :—'To carry out effectually a project so grand and so truly beneficial as the one proposed by the Colonial Botanist, we ought to start on a firm basis, and with this in view I would again venture to suggest that a German forester, from one of the best schools, be brought to the Colony. Let him introduce the system of planting &c., best suited to the Colony, and carry it out successfully, or, perhaps, what would be better still, send a qualified person to Germany for two or three years, to make himself thoroughly acquainted with the different modes of planting, &c., as adapted to different soils and situations. When thoroughly instructed, let this person return to the Colony, and the Government establish a forest school under his superintendence and instruction. In a few years we should have practical foresters available for many districts, and plantations could be commenced on a large scale on the best-known principles, and with little fear of failure.'

I considered then, and I consider still, that there is no insuperable difficulty in the way of establishing such a School of Forestry in the Colony as was contemplated by these advocates of the measure, beyond the difficulty of obtaining through Parliament a grant of the necessary funds, in the then existing public opinion in the Colony on the subject of the Crown forests, and in giving evidence before a Select Committee I suggested [*ante* p. 128] that some one acquainted with the forests of the Colony should be commissioned to visit the Schools of Forestry in Germany, and, if it were thought desirable, to visit also the forests in other parts of Europe, and report thereafter what had been seen, or what had been suggested by what was seen, applicable to the management of forests in the Colony, whether relating to matters pertaining to private enterprise, or to matters pertaining to Government control.

Nothing came of these several suggestions at the times in which they were made; but though a corn of wheat falling into the ground may die, it afterwards bringeth forth much fruit; and some fifteen years later, through the good offices of officials

in the forest service in India, the services of the Count de Vasselot de Régné, an elève of the School of Forestry at Nancy, were secured by the Government as Superintendent of Woods and Forests in the Colony.

From the report given in the *Argus* of the day, of the discussion in the Legislative Assembly which ensued on the estimates of the Government for the year being submitted, and being found, as was expected, to comprise an estimate of the sum which would be required for the salary, &c., of the superintendent, and the expenses of his office and operations, it appears that a bitter and violent attack upon the measure was made by one and another of the members. But the grant was carried; and forthwith a new regime was inaugurated, with results which must soon, one would think, have satisfied the most decided opponents, that it was one likely to revolutionise the whole system of the administration and treatment of the forests which had previously been followed, and to do so to the benefit of the Colony in various ways. In what particulars this was done willappear as we proceed.

CHAPTER II.

REPORTS OF OPERATIONS, WITH A STUDY OF THE REPORTS GIVEN IN SUCCESSIVE YEARS.

SECTION I.—REPORT OF OPERATIONS FOR THE YEAR 1881.

IN the report of operations in 1881 the Count de Vasselot stated :—

'In pursuance of the instructions of the Honourable the Commissioner of Crown Lands and Public Works, dated the 20th of April, 1881, I embarked for Mossel Bay on the 5th of May last.

'Starting on this journey, accompanied by Captain Harison, Conservâtor of forests at the Knysna, I made an examination, from a forester's point of view, following the route which had been pointed out to me, passing through George, the Knysna, Zitzikamma, Humansdorp, Port Elizabeth, Alexandria, Graham's Town, King William's Town, Pirie, Stutterheim, Queen's Town, Katberg, Kat River (or Stockenstrom), Graaff-Reinet, and Beaufort (West)

'According to Ministerial instructions, the points which I was required more specially to examine, and to which I should very carefully direct my attention, were the following:—

'1. General management of forests. 2. Methods of working. 3. Conservation. 4. Replanting 5. Preservation from fire. 6. Utilisation of timber; and generally, whatever bears, upon the creation, existence, preservation, and multiplication of trees.'

In the report given by him of observations made in the course of his tour, there is stated, amongst other things— the area and conditions of the forests, the proportional quantities in which different kinds of trees exist in the forests, the proper seasons at which these different kinds of trees should be felled; and in regard to the method of exploitation followed, he reports :—

'The felling of trees is prescribed by regulations (Govern-

ment Notice, No. 361 of 1875), in which wise provision is made to secure the best method in every respect. By the terms of these regulations the Crown forests are open to persons provided with licenses to cut the different kinds of timber during the season, considered suitable by the forest rangers in charge, and at none other.

'The price of the licenses, and the kind and measurement of the wood composing the load which the license gives the right to cut, are clearly stated, and the manner of proceeding is, as nearly as possible, as follows:—

'For instance, a person requires stinkwood, and procures a license. For one load of 60 cubic feet he pays 30s. (thirty shillings).

'He presents this license to the ranger charged with the custody of that part of the forest named in the license. The ranger registers and countersigns the license, and then returns it to the owner, who has, thereupon, the privilege of felling the timber specified in the license, at the spot pointed out by the ranger. The wood when felled is inspected, measured, and marked by the ranger before its removal. It is inspected a second time at the place where the wood is stacked for sale, and after that, the owner disposes of it as he thinks fit.

'On the other hand, when the Government requires a considerable supply of wood, for example several thousand sleepers or telegraph poles, it makes an agreement with a contractor, and the latter executes the order in the portion or ward of the Crown forest which is pointed out to him, whence he transports the timber to its destination, and delivers it according to the price agreed upon.' And he goes on to say:—

'The first settlers in a country have imperious and immediate wants. In the first place they must have wood.

'In European forests many rights of usage have been conceded at the time when they covered a large territory on which it was necessary to locate settlers. These rights became afterwards the source of so much trouble, and caused such enormous loss to the State, that it was found necessary to repurchase them, no matter at how great a sacrifice of public money.

'At the Cape, in the early days of its colonization, people took from the forests merely the wood necessary for dwellings, tools, fences, waggons, &c., without troubling themselves about the future. A little later, those who took wood from the public forests were compelled at once to pay its value into the public treasury

'This was well enough at the time, and it was only just, in fact, that such a payment should contribute towards the funds by means of which the Government carried on the public service, and that it should lighten, although but in a small degree, the charges imposed upon the community in order to make up the budget. Afterwards the Government made a fresh effort to infuse method into these matters, and hence the regulations of 1875, which have brought about a great improvement.

'I shall now consider whether it is possible and opportune to improve upon this system.

'In the olden times, if a man wished to build himself a house he went to the forest as to an inexhaustible store from which he could be supplied gratuitously, where he looked around for a tree of a species, shape, and size suitable for his purpose, standing in a locality whence there would be little difficulty in transporting it He felled it without troubling himself to ascertain whether it was still in active growth or had arrived at maturity, or whether he should clear the spot if a neighbouring tree of more advanced growth was stretching its branches over the space lately occupied by the tree he had just felled and thus rendered impossible the development of any saplings. Thus—without taking any precaution to avoid injuring, crushing, or cutting the surrounding trees which, doubtless, rather interfered with the removal of the other tree, but which, though still starting into growth, would, in their turn, if properly cared for, become trees—the selected tree would be cut away at such a height from the soil that a portion of the trunk was wasted, and the stump would yield no fresh shoots under favourable conditions. In selecting the tree the settler considered only the length of the timber wanted, and if the tree could yield more workable wood than he required the remainder would be abandoned, wasted, and left on the spot, together with the head, stump, and branches.

'The presence of such *débris* on the soil would probably result in preventing any young plant from developing itself in that spot.

'The wood in process of decay would become a haunt of insects and a factor in rendering the blaze fiercer in case of fire.

'In fine, there is nothing rarer than to see young and healthly trees, of valuable kinds, in localities where timber can be felled. Brushwood, creepers, and twining plants overrun the ground and smother the few young and greatly-injured saplings, which, under such circumstances, can become nothing but useless and stunted trees.

'In the second stage the settler is compelled to pay something to the Government in compensation for the wood which he has removed, but even then he leaves no less disorder in the forest after his departure.

'By the regulations issued in 1875, the Government is completely protected as concerns the recovery of the price for wood felled in the forest.

'The Government is now desirous of knowing whether the Colonial forests should continue to be treated as if they were, as far as relates to the needs of a progressive community, in reality inexhaustible; and of ascertaining what can be done to improve the mode of felling trees.

'The general idea which prevails in respect of the felling of wood in the forest, is even now that which originally arose from the necessity for satisfying the wants of the immediate moment.

'When anyone desires a load of timber, for waggon-building for instance, he procures a license which specifies exactly the quantity, kind, and price of the wood he is authorised to cut. At the spot pointed out to him in the forest, he selects the tree most suitable to his requirments. He does not choose such and such a one, because it is too large, and because its transport and sale would not be so easily effected as those of a tree of smaller dimensions; nor another tree, although full-grown, because it has some defect; nor a third, because its removal would be a little more troublesome.

'In fine, having obtained a license for a load of waggon-wood,

for instance, he of course takes that which will suit his purpose best for the construction of a waggon.

'The valuable wood in each tree is exactly measured; the license holder pays his license money, and the spots where the trees have been cut are reduced to the condition I have just described.

'When a forest lot has been thus denuded of its timber it is closed, and left to Nature's kindly offices to repair the disorder in which the place has been left. But in addition to this, as the forest district of Knysna, where the best timber of the Colony is to be found, still contains stinkwood, yellowwood, and assagai wood, the license-holders, having the choice, prefer taking these, particularly the stinkwood, rejecting the iron-wood, and several other kinds of trees, which, though very useful, belong to an inferior class. Thus, when a forest section is closed it is because it has been deprived of its most valuable products, although it is furnished with workable trees, which have been passed over, either because they are too large, or because they are of a species of wood which, although frequently quite as good as that imported, is yet not quite so easy to work as that of neighbouring trees, which can be selected; and this goes on to the detriment of the forest. The old trunks encumber the ground and impede the growth of the best kinds of trees. The latter thus become still rarer, and will soon disappear from the districts where they are felled now, unless measures are taken to prevent such a deplorable consequence.*

'There formerly existed in Europe a system somewhat analogous to this method, namely, "jardinage," which consisted in clearing away, here and there, the oldest trees, those decaying, diseased, or withered, and those of mature growth, required for the purposes of trade or for local consumption. As regards the future of the forests, this system is far

* Stinkwood is now found only in the district—very limited in proportion to the extent of the Colony, bounded by Mossel Bay, the Outeniqua, Zitzikamma River, and the sea: although Dr Pappe, in speaking of this species, says that it 'grows in the principal forests throughout a great portion of the Colony.'—*Silva Capensis*, 1862, p. 32.

preferable to the licensing plan, since it clears the soil at least of all mature trees, and thus provides space for those not full grown.

'There are, however, certain disadvantages attendant upon this method.

'"The result of this mode of operation is that the forest presents to view at every point trees of every age, mixed indiscriminately, from the young sapling to the old tree, and that the trees which attain the greatest bulk and height, interfere with those placed immediately under their shade, and impede their growth; thus the latter, not having sufficient room, stretch out in branches and nearly always become knotted, and do not attain their natural height.

'"The most feeble trees, stopped in their growth by those which overtop them, contract seeds of disease when this condition of over-crowding is continued; they nearly always languish, seldom arriving at a healthy maturity, and often they die.

'"This 'jardinage,' by extending the felling of trees over very large areas, renders its supervision difficult, and considerably increases waste in both felling and clearing. The greatest objection, however, which is consequent upon this method is, that it does not enable the forests to yield, within a given period, any products but those of a nature very inferior, in regard to both quantity and quality, to those obtained by the natural method of propagation by seeds and thinning out.*

'"In fact, in forests so treated (jardinées) we see trees of every kind restricted in their development for a time of greater or less duration, and often, even to the close of their existence.

'"In regular woodlands,† on the contrary, the growth is encouraged from its commencement, and stimulated up to the period of maturity, by periodical fellings undertaken with this very object. Now it is evident that, of two forests, that which

* 'The method of natural renewal and thinning out consists of working the forests in such manner as will ensure their natural and perfect re-stocking, by encouraging as much as possible their growth from their early youth up to the period of their felling.'

† 'A woodland is called regular when it exhibits in all directions a uniform and complete stock of trees, of ages suitably graduated, and when it contains within itself all the elements necessary for ensuring its natural reproduction.'

will supply the most material in a given time, is that in which the generality of trees has the strongest and most sustained growth, other circumstances being equal.

'"With regard to the quality of the trees, the facility which they have in forests subjected to jardinage to extend their branches, renders them inferior for constructive and splitting purposes to those which had grown in a wild state; and it is to be observed as well, that the considerable waste caused by felling and clearing in such a forest, multiplies faulty trees such as are seldom met with in regular woodlands."*

'I think that if the treatment to which the forests of the Knysna are at present subjected were changed for that of a jardinage judiciously applied, their production of valuable timber would be more than doubled in a short time; and, if they were continuously treated in a rational manner, this production would doubtless double itself again; that is to say, it would be four times greater than it is at present.

'However this may be, it is urgently necessary, by either one method or the other, to relieve the soil of full-grown trees, of perishing timber, and of trees belonging to species of second rate quality, which occupy the ground unprofitably. In the second place, it is none the less essential, during the operation of felling, to clear the soil of *débris* and the young plants from the creepers and brushwood which smother them.

'The ways and means of doing this, which appear to me preferable, are set forth in the chapter in which I have grouped my recommendations in order to give shape to these measures as a whole, they being in the true nature of a careful organisation.'

There follow observations on the natural history or habit of growth, and physical properties of some of the kinds of trees found in the forests, and on the importance of suitable roads for the transport of timber. In connection with this, Count Vasselot remarks:—

* *Cours élémentaire des Bois, par MM. Lorentz et Parade*,—a work translated into English for the Government of India. (G. Huriot.) (*Courrier Française*, 5th August, 1865.)

'At present a road is being constructed passing along the district of Sourflat. The workmen have certainly cut much more timber than was necessary for the formation of the road.

'The trees felled represent a very considerable value, to a great extent lost, because at the time of the actual cutting down there were no convenient means of removing them. The men cut off the best pieces in short lengths, which are quite unserviceable, in order to throw them aside more easily, and the remainder is wasted on the spot.

'If the workmen had limited their operations in the first instance to cutting the trees growing upon the roadway, or at the spots whence earth had been removed; or if they had even considered it necessary to afterwards clear away the timber from the sides of the roadway, considerable profit could have been derived from the wood, because there would have been room made for getting it away, so that even if the extent planted had not been further diminished, the Government would not have been deprived of the commercial value of material now wasted. But probably the workmen considered this too troublesome, and thought the removal was necessary in order to prevent injury to the road by the proximity of overshadowing trees.

'It should have been borne in mind also, that the trees standing on the sloping ground to the north would have done their part in contributing to the solidity of the embankments, and have been a protection to spans of oxen, and a means of security for loads and travellers.

'In other countries, far from felling timber in those parts which command a line of road, haste is made to plant the embankments.

'In this way also the trees stop the rubbish which the streams from the higher ground carry down with them, and also give security against the land-slips always to be dreaded in newly-made embankments.

'This line of road does not appear to have enhanced the value of the timber of the forest to such an extent as one would have expected, considering how much has been spent upon it.

'Timber is a product at once cumbersome and heavy, and the declivities are such, at certain points, as to render it difficult for heavy loads to be easily moved. Further, the crossing of the river Homtini is accomplished by means of a causeway and not by a bridge. In winter, at the time of floods, there are delays and difficulties in crossing, which increase the expenses of transport, and the inhabitants of the neighbouring division of George will, it is to be feared, still prefer importation by way of Mossel Bay, and other sources of supply to which they are accustomed.

'There is, moreover, in course of construction in this division, a route which will cross the Zitzikamma. It will give access to districts hitherto inaccessible.'

There are given calculations of the total consumption of timber in the Colony, Colonial and imported: the former estimated approximately at 250,000 cubic feet; the quantity entered as imports, 2,014,313 cubic feet; in all, 2,264,313 cubic feet; of the different quantities of this required for the construction of buildings, and the manufacture of vehicles, in shipbuilding, fences, cabinet-making, railway sleepers, and telegraph poles; and of the saving of expenditure which would be effected by the employment of Colonial instead of imported timber. And these calculations are followed by the remark—'The improvements which the Crown forests of this Colony admit of should raise their production of timber to the level of the present consumption, and increase it by well-conceived plantations, whose sites will not usurp the place of more important works, and will at the same time insure an increase of production commensurate with the augmented consumption which the future of the Colony appears to promise.'

This statement may be startling, but the extent of existing forests is considerable, and they admit of indefinite extension.

'There exists,' says the Report, 'no exact data of the extent of the Crown forests situated outside the district of the Knysna, but from what I have seen I am persuaded that the forests of the three divisions of George, the Knysna, and Mossel Bay, represent very much in extent, and especially in material,

more than half the resources of the Colony. Until we obtain full information, we will assume that there should be 100,000 morgen of Crown forests, affording a productive material of 50,000,000 cubic feet, or say an annual yield of 600,000 cubic feet of timber of every kind.

'The stock of old trees of secondary species is less than 10,000,000 cubic feet.

'It might be advantageous to use this superabundant material, the accumulations of centuries, and it is certainly necessary to free the forests of it, proceeding carefully, cautiously, and steadily.

'Treated in a reasonable manner, the Crown forests should produce annually at least 3,000,000 cubic feet of useful wood.

'Private forests attacked by the axe and fire, are on the road to a rapid detimbering; they do not cover more than 20,000 morgen, and they do not contain timber to any appreciable quantity, except in those parts which have been recently sold.

'The extent of bush land is even more uncertain. Regard being had to the positions they occupy, and referring to such information as I have gathered, I think that their extent may be estimated at nine times that of the forests, say, 108,000 morgen. Thus 12,000 morgen producing timber, 108,000 morgen of brushwood, suitable for firewood, in all, say 120,000 morgen.*

'Besides the above, there are timber in certain kloofs in portions of the divisions of Namaqualand, Calvinia, and along the Orange River, described in the map of 1876, containing a large forest of aloe trees.'

There is next discussed the influence of forests on climate, and there are cited for comparison the forestal conditions of numerous countries in Europe, also Africa and America, which is followed by the remark:—'From this cursory examination of various facts, it will be seen that even those countries posses-

* 'From information which the Surveyor-General has been good enough to furnish, it appears there is a large tract of forest between the divisions of Uitenhage, Alexandria, and Somerset, known as the Addo Bush, but this tract is unsurveyed. It is believed to be chiefly high bush and forests (unsurveyed), occupying a surface of about 100,000 morgen.'

sing the fewest forests are much better wooded than the Cape Colony is, even if my estimate of its timbered area were too low by one-half or more. But the Colony possesses excellent kinds of indigenous timber.

'The small quantity of forests which it includes would suffice, if properly conserved, improved, and enlarged, as regards the present, for the requirements for a population still few in number relatively to the extent of its territory.

'Finally, the exceptionally good nature of the soil renders success certain if the work of planting the mountains and the sandy coasts is undertaken with determination.

'But the development of the Colony is, at this rate, like the idea expressed in these words:—" Forests precede a population, and deserts follow it." '

And there are submitted the following recommendations:—

'The Colony possesses very few forests in comparison with the extent of its territory.

'No time should be lost in examining with the greatest care all those portions of the forests which belong to the Government, and, in conducting such an examination, to make a classification of their contents; and they should also be surveyed by making a plan of the untimbered area necessary for their maintenance, while steps should be taken as soon as possible in regard to most active measures for ensuring their conservation.

'The question of ownership should be decided without delay, at least in so far as concerns lots in litigation, in order that the true owner, whoever he may be, shall be able to look after his own interests, in the case of a private property, as well as for the public interests in that of property vested in the Crown.

'By a practice analogous to that recognised as necessary in Sweden, in the Kingdom of Saxony, and also in France, if, in the recently annexed territories, such as the Transkei, for instance, or elsewhere, there are forests, endeavours should be made to acquire them; this being the only means of preventing their spoliation, and ultimately their complete ruin and destruction.

'The Crown forests ought to be conserved and improved with

all the more care on account of their limited area. The chief cause of their destruction is fire.

'In order to preserve the forests from fire, it is necessary, first, to clear the borders of the forest by burning in winter the grass which covers the ground, as is now done by Captain Harison.

'In the second place, we must clear the forest by removing the *débris* of felled trees.*

'The next step will be to cut, at intervals of about every 200 yards, paths, which will serve the double purpose of arresting a fire, and of facilitating the removal of timber, while at the same time contributing to the proper surveillance and control of the forest.

'Finally, there should be always a sufficient supply of seeds in store, and of plants in nurseries, in order that as soon as the ground has cooled the burnt tracts may be replanted.

'It will be necessary to decide whether the foregoing measures are legally applicable to Crown forests situated in the midst of farms, as well as those in locations.

'It will have to be determined also if it is necessary to introduce an Act embodying preventive measures, setting forth responsibilities, enabling repressive measures to be enforced, and supplying the void which now exists in our colonial legislation with regard to forests.

'Our forests are far from producing, either in material or in money, such results as the active nature of the growth of trees and the consumption of the Colony would lead us to infer is the case.

'Investigations must be made into the age at which the trees may be felled, and into the capability of each forest.

'Special instructions should be drawn up on this subject in regard to each forest lot.

'Among the species which stock the forests two kinds alone

* Waggons and oxen should be placed from time to time at the disposal of Captain Harison, to enable him to clear the districts where timber has been felled. The proceeds of the sales would also more than cover the interest on the capital expended.

are very much sought for, viz., stinkwood in the conservation of the Knysna, and sneezewood in the Eastern districts.

'The system of felling by license has a tendency to cause these two woods to disappe ar.

'In order to increase the production in material and money, and to keep up the supply of the foregoing valuable species, the ordinary fellings should be rated or assized according to the limited areas on which the material for disposal and that reserved shall have been previously noted, clearly indicated, and invariably marked. The part of the forest destined for felling should be sold at *per foot* by public auction, in order that the felling may be made conformable to the clauses of the conditions of sale.

'In cases where existing circumstances may not render a public sale immediately desirable, agreements for felling should be made upon conditions as near as may be to those of public sales, or licenses should be issued with due regard to the *defined contents* and under similar conditions, or the Government itself might undertake the felling.

'Thus, by following one or other of the foregoing modes of procedure, we should eventually arrive at the best system of selling by public auction.

'As a temporary measure, at places where there will be large contracts in course of execution, endeavours should be made to arrange with the contractor reasonable conditions for the extraction, on his own account, of timber which, in the interests of the forests and of the public, should be removed.

'At the same time a certain number of the superfluous and decaying trees, scattered over various districts, should be noted, marked, and sold, or cleared away, either in independent lots or in groups.

'Forestry operations should be conducted in such a manner as to encourage as much as possible the replenishing, diffusion, and growth of stinkwood and sneezewood in their respective districts.

'It being a principle that those who cause damage should make it good, and as felling always causes some waste in the forests, contracts made with purchasers, contractors, and licensees

should always stipulate the number of working days allowed, in order that the Conservator may utilise these days in the manner most advantageous to the interests of the public.

'For the purpose of facilitating the removal of the timber, and consequently its sale, waggon-roads should be constructed in all the forests where practicable.

'A movable section of the Decanville Portable Tramway* should be available for each forest, and being laid along the fire-paths branching out from the waggon-roads, would thus form feeders to these main roads or base-lines of communication, where felling is going on.

'Whenever a new road has to be made through a division or district containing forests, the departments of Public Works and of Woods and Forests should co-operate in order to ensure that, in clearing away the trees, the felling of timber should be strictly limited to as much only as is absolutely necessary for the execution of the work.

'Sawing-mills should be constructed near water-courses, which could use the water as their motive power; as well as at points situated between districts where much timber would be sold in small quantities; and at stations, whence it could be forwarded to other parts of the country.'

Much is then said in regard to the planting of trees to replenish exhausted forests, and secure the production of trees in districts in which they are awanting.

'When the value or worth of these woods shall have been officially and indisputably determined, they should be employed

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* The 'Porteur Decanville' is a small portable railway, patented in France, England, Austria, Belgium, &c.

It took the first gold medal at the meeting at Galway, and the inventor received the cross of the Legion of honour at the Universal Exhibition of 1878.

The line is composed of a series of sections of single lengths from 15 to 16 feet long, weighing from 110 to 120 lbs., each capable of being put in position instantaneously without addition of cross pieces (or sleepers) of any sort.

The width of the way (the gauge) is from 18 inches to 2 feet; it costs at the factory from 4s to 6s the running yard. Waggons (carriages) adapted to the transport of wood for earthworks, and transport of supplies of all sorts, &c., are manufactured at the same factory.

in Colonial public works for which they possess the requisite qualities. Care must be exercised, however, that the trees are never felled out of the proper season. We should follow the system of *conservation* which prevails in Europe.

'In order to render popular in the Colony the use of certain kinds of timber hitherto but little used, though of acknowledged good quality, it might perhaps be better to dispose of, on account of the Government, and in marketable sizes, a certain quantity of properly selected timber, which should be sent to the principal markets of the Colony for the purpose of being publicly sold.

'There is scope for inquiry as to whether the branches of the trees cannot be profitably converted into charcoal.

'In order to conserve and improve the forests of the Colony, and to increase their production for useful purposes, as well as to create the timbered surface necessary, officers should be appointed for this work, and there should be an organisation to render individual effort efficacious by means of co-operation. I think that such a staff should be gradually organised.

'The divisions of George, the Knysna, and Humansdorp, constitute the Conservation district of the Knysna.

'The Conservator, Captain Harison, has indeed done all that he has been able to accomplish, under the circumstances in which he has been placed, towards protecting the forests entrusted to him. He has carefully followed the instructions contained in the regulations, so as to insure felling the trees at the proper season. His efforts have been attended with no great results, because the system of licenses does not allow of them; but he has, nevertheless, made efforts to localise the felling of timber to places where supervision was possible, and also for the removal of mature trees from the open sections. He has prevented the total disappearance of stinkwood from certain lots by forbidding the waste of this precious and rare kind for purposes for which wood of less valuable species was suitable.

'He has rendered real service by insisting on the use of Colonial woods for sleepers and telegraph poles,

'He has busied himself in keeping wood-cutters employed around the forests.

'He has shown true discernment in the recruiting of his staff, being aware that the functions of ranger cannot be properly discharged except by respectable men, drawn from the labouring classes, who will not endeavour to escape from the hard daily work which their occupation necessitates, and having the degree of intelligence and the information necessary for the due discharge of their duties.

'He possesses a thorough acquaintance with the woods, climate, and soils of the districts. He has experience in the service, and instead of confining himself to running in the usual groove, he has not ceased to search for improvements and to recommend them.

'Whenever his assistance may be required in making the dispositions necessary for the management, improvement, completion, and extension of the forest scheme of this district, I have no doubt that his experience will be very useful, because experience is combined in his case with a mind amenable to all progress.

'At present it appears necessary to appoint an additional ranger in the forest conservation of the Knysna, in order to supervise the felling in the locality where Mr Dunn is preparing the 500,000 sleepers comprised in his contract.

'The omissions and absence of co-operation in the forest service of the Eastern Provinces have already been referred to.

'Before undertaking in this district what is necessary for the conservation of these rapidly-decreasing forests, it is absolutely essential that a superior forest officer should be appointed for the purposes of centralising the correspondence, administrating the primary preservative measures against fire, as well as against the unseasonable destruction of young saplings and felling of timber, and to initiate investigations as to the durability and the felling of the timber, together with the capability of the forests.

'This officer should possess the following qualifications :—

'A knowledge of timber ;

'A knowledge of the country ;

'A knowledge of the laws of the Colony, and of the regulations of its Civil Service.

'He should be of such age, education, and social position, as would permit him to associate on equal terms with Civil Commissioners.

'He should possess sufficient activity to enable him to make the extended investigations in the forests which his duty commands.

'As has been remarked already, a ranger at Keiskama Hoek, as an assistant to the Conservator, would be of great service.

'A third functionary is indispensable to the Colony, for the works of replanting on the flats, for those to be undertaken at Beaufort, for the plantations to be continued there, and for general forestry service in the Western districts.

'In my opinion, for the purposes of determining the yield, and making an inventory of the material of the forests, and for stimulating the activity of the other branches of the service, it will be necessary to procure the assistance of an experienced forester, from the class of head-ranger (to be styled "Sub-officer, or brigadier of forests"), having a thoroughly practical acquaintance with all the details of forest work, and able without delay to set the staff of Colonial rangers to the work which forestry operations and fellings of timber for sale render necessary, including surveying and levelling.

'An assistant of this class was given in 1866 to every French agent charged with the survey of the forests of Turkey; and in this country, where it is necessary to establish a regular and permanent system for all the details of the Forestry Department, such a course is even more essential than it is elsewhere. No time, therefore, should be lost in satisfying this want.

'This organization, when completed, will suffice for initiatory measures; but as soon as the mode of felling by agreement shall come into vogue, and the execution of forestry works, in addition to those proper to the conservation, improvement, and development of the forests, shall be decided upon and commenced, each superior officer will evidently need capable assistants, similar to those who are trained to assist heads of

service in India, and who will in course of time take their places.

'It has long been acknowledged everywhere that in order to take care of the forests we require officers who will study the trees from an economical point of view, as scientists and botanists do; who understand the cause and principles of growth and decay; who can prove, by demonstration, the experiments they make, and at the same time justify an axion by experience; and who will be competent to direct works in connection with felling and replanting.

'The British Government, as the result of experience, has come to the conclusion that the best training is given in the School of Forestry at Nancy, and has entered into an arrangement with the French Government, by virtue of which each year a certain number of young men are selected to pass through the curriculum of that school. During their stay at Nancy they are under the charge of Colonel Pearson, formerly Conservator of the forests of India.*

'I would submit that the Cape Government should, without delay, select four young men in the same manner as is done by the British Government; and since they would be, as Colonists, British subjects, it would suffice, I imagine, according to the terms of the existing arrangements, to negotiate with the British Government to this end, in order that no obstacles or delays may intervene. I consider this step as the best possible that can be taken in the future interests of the Colony. The session of the course at Nancy usually opens early in November, and the duration of the period of study is from two to three years. There is therefore not a moment to lose if advantage is to be taken of the ensuing scholastic year.

'In France forest officers are exempt from military service, strictly so-called, but they constitute an auxiliary army corps, which rendered eminent services during the invasion.†

* This arrangement has been changed for attendance at the Royal College of Engineers at Cooper's Hill, near London, and by three successive Parliaments Select Committees have been appointed to consider the expediency of establishing a British National School of Forestry.—J. C. B.

† See the commendatory remarks of the Duc D'Aumale, with reference to the Bazaine Trial, and the letter from General Gambriels.

'I think that a similar organization could be made as regards the Forest Service of the Cape Colony.

Conclusions.

'The general view of the course thus marked out comes under three heads.

'1. The application of the best possible treatment to the existing forest lands.

'2. The introduction of timber trees among the bushes.

'3. Planting trees on lands where forests are necessary.

'These three measures, pursued with energy, confidence, and perseverance, will lead to the following results:—

'1. To draw from the Colony itself all the wood necessary for its own consumption. By this means an annual sum of £500,000 or more will be expended here, instead of, as at present, paid to foreigners; this is borne out by the Custom-House returns of importations, and will, without doubt, lead to a greater increase of wealth in the future, in preparation for becoming a wood-exporting country at a time when wood will be more scarce in other parts of the world.

'2. To regulate the water-courses, and render drought, from which under present conditions the Colony suffers, less frequent.

'3. As a consequence of these two effects the development of colonisation will be powerfully helped forward.

Together with these general recommendations, there are suggestions made in regard to what it seemed might be done with advantage in connection with different forests which were visited. Some of these related to the importance of having a staff of trained professional foresters, with necessary facilities for determining and executing what the existing condition and subsequent conservation and economic exploitation of the forests required. In regard to the forests at Alexandria, he reports:—

'The forests are looked after by a ranger, who does not appear to have any superior chief other than the Honourable the Commissioner.

'I should here note the zeal and activity with which the

present ranger, Mr. Nightingale, collected the information requested of him.

'Nevertheless, the conservation is not carried out with sufficient efficiency, according to the present system.

'There is an imperative necessity, before undertaking any improvements in this direction, for the presence, within a convenient distance, of an intelligent forest officer, capable of understanding the meaning, scope, and spirit of instructions which he would receive, and of being at the same time the counsellor, guide, assistant, and controller of the rangers of the province.

'The Crown forests of King William's Town are situate at the north-west of the division, in the mountains of Pirie and Keiskama Hoek. They stand in a soil much less dry than that of the forests of Alexandria, and the trees attain very considerable dimensions. The species resemble more nearly those which compose the Knysna forests, but we saw no stinkwood or witte els.

'Yellowwood is much sought for. It is the only wood at present allowed to be supplied for railway sleepers.

'The forests of this division have not been surveyed. Some licenses are granted for cutting timber and firewood, as also for taking saplings for the purpose of constructing huts and kraals.

'The staff charged with the administration of these forests is composed of Baron de Fin, Conservator, one head ranger, and six subordinates. Correspondence with the chief office is conducted through the Civil Commissioner, who is called upon to give his advice upon forestry questions.

'The Conservator states that the native rangers have not sufficient capability to perform the work which their duties demand. Their position among their tribes cannot fail to be a very delicate matter, when the interests of the forests are in opposition to those of their relations and friends, and especially when neither of them comprehends for a moment the utility of the measures which conflict with their interests.

'However this may be, the case is one pressing for attention, and particular heed should be paid to the following points:—

'1. To accurately determine the situation of all Crown properties as fixed by law.

'2. To draw up a valuation of the Crown forests, or pending something better, at least an approximate one.

'3. To take precautions against the dangers of fire, such as are adopted in the Knysna, by keeping clear the borders of the forests.

'4. To have rangers capable of preventing the young trees from being cut for the construction of huts and kraals.

'5. To fix the seasons during which the various kinds of timber are fellable, and to disallow their being cut at any other, conformably to the Regulations of 1875.

'6. To allow no herds or cattle to penetrate the forest, if it can be helped, or at least to prohibit their entering the districts where felling is taking place.

'7. To watch carefully that the felling by contractors is not mixed with that of others who hold licenses.

'In this district, more particularly than that of Alexandria, the supervision of a superior overseer would be necessary.

'Such a task could hardly be imposed on Baron de Fin, whose length of service, experience, and devotion, cannot be better utilized than at the locality itself of which he has the charge. It would be necessary to give him an assistant, who would fill the functions of second upper ranger for the portion of the forests nearest to Keiskama Hoek, now too far removed from the only existing head-ranger. This assistant should, at the same time, serve to ensure the carrying out of the forest regulations, and should also keep the books.

'A ranger resides near Stutterheim. In approaching this town, it is perceived that timber becomes rarer and rarer. In the east of the division there is none existing.

'The production of the forests managed by the Baron de Fin, in 1880, was as follows:—

Timber, - - -	48,700 cubic feet.
Huts and kraals, - -	184 loads.
Firewood, - - -	1,545 loads.

'The total value amounted to £1,667.

'The books of the Baron de Fin, the Conservator, are very carefully kept.

'From Stutterheim to Queen's Town the country is absolutely devoid of timber.

'A sum of £500 should be devoted to plantations at Cathcart.

'There exist no Crown forests in the division of Queen's Town, but the Government possesses about 30,000 morgen of Crown lands, of which the larger part could, without doubt, produce trees, if works for planting were carried out there. The soil has the reputation of being unusually fertile, and the scarcity of water is the only thing that the owners of the ground appear to dread.

'The postal line from Queen's Town to Fort Beaufort crosses the Crown forest of Katberg, in the division of Stockenstrom. The district through which this route winds is a steep mountain side, now desolated through having been burnt.

'Nature, alone, appears powerless to repair the waste occasioned. The land, still studded with trees, dry at their base, is overrun with bush and creepers, amongst which we could discover no natural sapling of a timber tree.

'Here, as in the division of King William's Town, the extent and contents, &c., of the forests have not been examined.

'I drew the attention of the ranger, Mr. Atmore, to this absence of information on his part, and I showed him how he could determine approximately (until something better could be done) the extent and the value of the forests of which he has charge. He, with a zeal which I feel it my duty to record, explored the lots placed in his charge, and collected the particulars in the table annexed to this report, which show the apparent capability of the forests in the division of Stockenstrom.

'Undoubtedly, the first thing to be done on this point should be to define, as regards the Crown forests, the nature and extent of the rights reserved by the Government, and to decide as to how far it is practicable to enforce them.

'The superintendence of the forests in this division is entrusted to two rangers. The chief ranger has no superior chief upon forestry matters, other than the Commissioner of Crown lands. He is absolutely isolated in the country, without assistance, advice, or control.

'Can he anticipate eventual difficulties, or prevent that which is unavoidable?

'Has he even sufficient preliminary ideas to enable him to grasp the origin of such questions, with their details and consequences? and to explain these points, and furnish useful advice upon them?

'In this district, as well as at Alexandria and King William's Town, the experience of a superior forestry officer would be indispensable.'

In the *Revue des Eaux et Forets* for December, 1881, appeared an account of the Crown forests of the Colony, in which Count de Vasselot, amongst other things, stated :—

'The charge of these forests pertains to the Ministry of Crown Lands and Public Works. They occupy an area of about 1,200,000 hectares, or 225,000 acres, but 100,000 imperial acres only are in the condition of timber forest, the remainder consists of firewood in the condition of coppice of mediocre quality. The timber forests contain many good kinds of trees, of which two are remarkable for their qualities. There are more than seven or eight millions [of hectares?] of land belonging to the Crown, situated in mountain regions, which are absolutely fit for nothing but reboisement. What a field for work!

'In the rude forest service which exists there are six or seven special agents in correspondence with the Commissioner—or, it may rather be said more correctly, supply to him, once a year or so, an account of moneys received by them for licenses granted by them to fell trees. At places too remote for these agents to include them in their circuits, these are granted by Civil Commissioners. There should be at least seven distinct and well-organised great forest services, in which the chief official may carry out the administration; but the Government, if it be disposed to recognise the utility of the conservation and restoration of the forests, has to take into account the financial condition of the Colony, and the local requirements.'

And there follows an account of the civil and political constitution of the Colony, and of the lack of satisfactory means of inter-communication between different parts of the country.'

In regard to destruction of forests by fire it is reported :—

'In the division of George, the Knysna, and Humansdorp, the space cultivated with cereals is very small: the remainder comprises waste land on which cattle are depastured, and the grass is renewed by setting fire to it periodically. By following this plan the growth of trees on these properties is impossible, so that absolutely none are seen in the country. The proprietor is quite content if he can save a few about his dwelling. From these useless pastures the fire spreads to the woody kloofs surrounding the farms, each time burning a belt of forest of a greater or less breadth, until the timber has been completely destroyed. This can hardly be otherwise, as things are now.

'Occasionally fire originates in the forest itself, consumes the underwood, and chars the bark of the trees which wither very soon afterwards. If this timber were immediately felled it would lose nothing of its value, but those who take out licenses do not generally select it; thus it decays on the spot, and, as a material, is absolutely lost. Generally the Keur grows abundantly where these fires have occurred, taking the place of the burnt timber; until even this disappears in its turn, when the forest is finally denuded, to an extent equal to that over which the fire has spread.

'Captain Harison has not allowed the question of these fires to remain without inquiry, and has made the following observations:—

'1. They rarely commence in the forest.

'2. Those which originate in the forest are not so dangerous as fires which proceed from a more general conflagration of the neighbouring parts.

'3. In winter, when the ground is moist, the fire does not penetrate the forest.

'From these facts he has concluded that by burning in winter the grass near the forests, and in thus keeping clear their borders, greater numbers of these disasters would be avoided.

'This has been done in his division, and since the practice was adopted there has been no large destruction to deplore.

'This is an excellent arrangement. In perfecting this practice by others which will be indicated further on, I think

that in a great measure these disasters will be avoided, and we shall succeed in remedying in a prompt, economical, and efficacious manner, the bad consequences which could not have been foreseen.

Section II.—Report of Operations for the Year 1882.

The report of the Superintendent of Woods and Forests for 1882 speaks of work done. In the opening paragraphs he says:—

'In my previous report I described the forest condition of the districts which I had visited, mentioning the general state and requirements of the Colony in this respect. Reference was then made to the climatic influence of forests, and a short sketch added of the position occupied by forests in other countries; finally, suggestions were offered on the most important points.

'I now proceed to speak now of the actual yield of the forests, noting the changes which are now in course of application, and pointing out those which appear to be most urgently called for.

'The revenue from the Crown forests has risen to £7,680 14s 1d.'

A detailed statement of revenue obtained from different forest divisions and sub-divisions is given. And in the concluding paragraphs of the report, it is stated:—

'Except under exceptional circumstances, re-foresting can only be effected on land which is still in Government possession. It is evidently desirable that all proposed alienations should be visited and reported upon by a forest official. This precaution is equally necessary in forest tracts, where rivers rise, and in dry regions cursed by droughts. For, if all the land in these dry regions were alienated, there would be an end at once to all forest schemes for their improvement. Another important measure to be considered is that of sending forest students from this Colony, as soon as possible, to the School of Forests at Nancy; provision for their necessary expenses should be entered in the estimates.

'I think, too, that the time has arrived for the constitution and organisation of a distinct department for forests, of course under the direction of the responsible minister. This measure

is necessary to secure unity of working. By it only can we insure that all those who have anything to do with forests may, as it were, participate in their working; both he who works in the woods, and he who turns forest produce to use, either in the public service or in private enterprise. These should look to the Forestry Department as the depository of that special knowledge which it represents. This is the only means also, of avoiding that appearance of want of harmony which is almost inevitable when suggestions on the same subject emanate from more than one office.

'The first step in enlisting professional knowledge has been taken, allowing us to begin systematic forestry. Minor considerations should not be allowed to turn us aside, or impede progress in the path on which we have entered. I may, in conclusion, once more repeat my opinion that the Crown forests, regularly worked, would produce a revenue of at least £235,000 (two hundred and thirty-five thousand pounds), this being the sum which leaves the country every year to pay for imported wood. Its forests ought to be a mine of gold to the Colony; while the plantation and re-foresting of mountains will, in conjunction with hydraulic works, turn to the best account the rainfall of the country. Irrigation would then be easier, and agriculture a veritable mine of diamonds.'

An important contract for the supply of 500,000 railway sleepers from the Knysna forests, which had become impossible of execution, was formally cancelled, and thus it become practicable to introduce exploitation on the method most approved by students of forest science. In regard to this, the Superintendent writes:—

'Since the year 1868, every one has been agreed on the necessity of working the forests by sections. This fact is established by unanimous evidence given during an inquiry held at that time.* But it has always appeared impossible to

* Report of a Commission appointed by H.E. the Governor, to inquire into matters connected with the working, &c., of the Crown forests, in pursuance of an address from the Honourable the House of Assembly, dated the 11th December, 1886, presented to both Houses of Parliament by command of H.E. the Governor, 1868—(*ante* pp. 167-177.)

put these views into practice. The difficulties are that, although there are many wood-cutters in the forest, one man, working alone, cannot afford to pay Government the price of a license. Indeed, he does not apply for a license until he has sold the wood of the tree he has selected for felling. Moreover, he is naturally desirous of securing the tree which can be most easily reached. How are we then to satisfy these various requirements, and at the same time to confine the work to one portion of the forest? Is this question answered by selling the wood, section by section, to one contractor, who will take upon himself the risks and the profits, and guarantee permanent work and pay to the wood-cutters? Recalling the case of the principal sleeper contractor, I hesitate to reply. He, backed by every resource of capital, machinery, and local knowledge, although compelled by his contract to cut sleepers section by section, protested energetically against being obliged to cut systematically wood required by him for commercial purposes. He was unwilling to make an attempt at cutting section by section, even for six months, though important advantages were offered him as a premium for so doing; so difficult did it appear to him to break through the established custom of the Colony. In presence of these difficulties, and fearing the expense, which had been much over-estimated, the attempt to introduce systematic working was not then persisted in by Government.

'The division of a forest into sections is, in fact, only desirable when it answers a double end. First, that of securing the conservancy and improvement of the forest, in other words, the reproduction of trees of the best species; secondly, that of meeting the demand for wood. Experience has taught that by dividing masses of forests into blocks, the wood-cutters will always have near their establishments a section of forest open and capable of meeting their requirements. These blocks should preferably have natural boundaries, such as ravines or mountain ridges, and, in forming them, account must be taken of the various circumstances of vegetation, soil, climate, and woodedness of the country. Each of the blocks is sub-divided into a series of sections, a section being that portion of the forest which is to be cut over during one (or two) years. A "management-

scheme," to properly ensure the conservation and improvement of a forest, must embrace the following points:— 1st. In every section, all trees still in full growth, or trees specially useful for shade or seed, must be reserved; and those cut must either be *exploitable* (mature) or such that their shade is injuring the growth of younger trees. 2nd. Each section remaining open in succession (say for two years), the trees left standing when the first section is finished will be again exploitable by the time that the last section has been cut. To secure the observance of these two points, each section must be examined, tree by tree; all trees, fit for felling, are then marked, and licenses only delivered for those trees that have been already marked as exploitable, or fit for felling. It is necessary to mark all exploitable trees with serial numbers, so that a tree can be at once recognised when asked for by a wood-cutter, and be clearly indicated in the felling license. Disputes sometimes arise between two people, in which each claims the same trees, and confusion may result in other ways unless the trees are numbered serially. Lastly, the exploitable trees must be valued as they stand, in order to settle the price to be paid for them before they can be cut down. The license is then made out (subject to correction if the tree should prove to be of less than the estimated value), and the tree becomes the property of the wood-cutter who has asked for it. The second point to be observed is, that a section once cut over must have complete rest during the remainder of the "rotation," that is to say, until it again becomes the turn of that section to be worked. Each section of the forest is cut during an annual or biennial period; thus the number of sections equals the number of years in the rotation (or if it is a biennial section, the number of years divided by two.)

'The rotation must be a number of years, such that the wood left on foot, when one section is cut over, has sufficient time to mature before that section is again cut over. The rotation of a forest may be defined as the lapse of time required for the complete and regular working of a forest. In a perfectly regular forest, each section during one rotation will pass through the varying phases of a wood's existence—seedling, sapling,

high-tree, and mature timber. The word for the rotation of a forest, in French forestry, "*Revolution*," expresses in astronomy the idea of a planet returning to any one position within a fixed period. To fix the rotation, and consequently the number of sections, in a forest series, we have to determine the ages at which different species of trees ("essences") are exploitable. On this point I have received conflicting evidence from wood-cutters, wood-owners, and others interested in forests. Thus, according to some, stinkwood is mature at 40 years; but according to others, not till it is 150 years old; and there is not even plausible evidence to support either one opinion or the other. Precise deductions cannot be drawn from the number of concentric layers or rings on the transverse section of a tree till it has been determined whether these rings bear a fixed proportion to the number of years in the age of the tree. In climates where a pronounced winter causes a prolonged check in vegetation, and a marked difference in the woody tissue, one ring usually marks one year. Sometimes more than one ring is formed in a year, and then it has to be determined how these are related to the regular seasons of the year, and how they are affected by irregular droughts and rains. Various experiments * have been set on foot with a view of obtaining information on these points; and as soon as we are in possession of precise figures, there will be a basis on which to settle rotations and arrange regular management-schemes. In the meantime, we must fall back on the practice of giving worked forests fixed periods of rest for 25, 30, or 40 years. During this transition period forests would be worked by cutting over $\frac{1}{20}$ of the area of the series during each two years. There would then be an interval of 40 years between the time that any portion of a forest were cut, and the time when it would again be brought under the axe.

'As far as possible, the sections should all abut on a central base line, for the general orderly arrangement of the cuttings, and to provide for the sections being easily lengthened or shortened afterwards, should this appear to be necessary. For

* Details of these experiments are appended to the Report.

it may be found, by the time that the last section comes to be cut, that the rotation has been chosen too long or too short, rotations at first must necessarily be provisional, and usually shorter than they would otherwise be, on account of the necessity of introducing a systematic gradation of ages as soon as possible, and in order to avoid leaving mature timber unutilized in the forest.

'"*Coupes*," or forest areas cut over, should be formed as far as possible, according to the following rules:—

'(1) In shape, the coupes should be long and narrow, and they should lie at right angles to the usual direction of violent winds: the wind should blow across them instead of down them.

'(2) The order of cutting should be so arranged with reference to the prevalent wind, that the first coupe is to leeward, and the last to windward. Thus, each coupe but the last, has the protection of a band of trees; and the wind blows seed on to the new coupes from the old trees lying to windward.

'(3) On the slope of a mountain the coupes should begin at the base, and proceed regularly towards the top of the mountain. This is the most favourable arrangement for natural reproduction, and usually, also for protection from wind.

'(4) Coupes should be so arranged that, as far as possible, the timber from a coupe being worked may be got out without being taken across, and damaging the growth in a coupe which has been cut over.

'The utility of these four rules is sufficiently obvious. It is equally evident that cases must often occur in which one rule cannot be put into force without breaking another. The forester must then use his common sense, and where two rules conflict, judge which is the most important. The selection of the individual trees to be felled or reserved in a coupe, requires at least an equal skill on the part of the man in charge of this work. He must take into account the form of each tree; its state and growth; its distance from the neighbouring reserved trees; its influence on the young re-growth around, as regards both shade and "covert" (direct overshadowing); its value as a seed-bearer. The division of a forest into series of sections is the first step to be taken in its systematic working. Here

again (putting aside the question of surveying), account must be taken of the configuration of the ground; of the climate; of the value of the soil; and of the economic circumstances of the country. In marking off coupes, it is necessary to have a thorough knowledge of all that favours the growth of trees. In marking trees for felling, the exact result to be attained must be borne in mind, the probable consequences of felling or sparing each tree considered, and the future of the forest kept ever in view.'*

The report shows a total revenue from the forests of the Colony, of which details are given, amounting in 1882 to £7,680 14s 1d. In connection with some of the forests, the expenditure was greatly in excess of the revenue. But it may be noticed that a good deal of the expenditure was connected with the replenishing and extension of the forests, and similar sylvicultural operations; and in other cases, the expenditure in excess of the revenue yielded by the forests of the district was profitably invested capital obtained from other forests. Looking to the total outlay, and the estimated possibilities of returns, from a continued treatment and management of the Crown forests for the Colony, in accordance with the principles adopted, it is evident that the Government were justified in doing what they had done; and, judging from resolutions subsequently adopted in both Houses of Parliament, the representatives of the country seemed disposed to say to the Government, Go on as you have begun! Go on and prosper!

Section III.– Reports of Proceedings in the Years 1883, 1884, and 1885.

Up to this time the regulations of 1875 were in force; but in April, 1883, new regulations for the working of Crown forests in the divisions of Knysna, George, and Humansdorp, were issued, and, as opportunity presented, occasion was taken

* 'These matters form the subjects of special studies in the academies, or higher forest schools, of Europe, notably in France, at Nancy, where the British Government trains the officers destined for the forest service of India. To form good officers for the Cape service, it would be of the greatest utility to send selected students to Nancy for training.'

to change for the better the distribution and location of officers in the service.

In the report of the superintendent for 1883 are given notices of what had been done on commencing a new regime. In the beginning of the report it is stated:—

'The work of the forest department, considered in its entirety, comprises many branches. Its aims should be:—

'I. To preserve forests in which timber still exists, from exhaustion by reckless and indiscriminate cutting, and by being thrown into disorder at anybody's pleasure. (Urgently required at Knysna.)

'II. To prevent exhausted forests from disappearing altogether, by giving them protection against encroachments which invariably follow fires and excessive cuttings; by preventing cattle from destroying young plants as they appear; by repairing and restoring those parts of the forests which have been in any way injured; by re-planting tongues of land stretching dangerously into a forest, which can be preserved only by including both barren and wooded land in one reserve perimeter for re-planting as quickly as possible. (Urgently required in Eastern divisions.)

'III. To lay out forests where they would be of benefit to the Colony. (Cape Flats and Table Mountain, for instance.)

'IV. To shew Colonial forest products to their best advantage by preparing them properly (sleepers), and by showing specimens at International Exhibitions for the information of the markets of the world. (Edinburgh, for example).

'*Conservation of Knysna.*—Operations under this head, on account of their urgency, are being specially directed to the forest conservation of the Knysna (divisions of Knysna, George, and Humansdorp), where are yet found magnificent remains of the primæval forests of the Colony.

'The forests of this region comprise about 50,000 morgen of wooded land, specially adapted for the supply of timber.

'*Exhausted Forests.*—The forests of George, and in the Zitzikama country, scattered to the east of the Storms River, and those in the Knysna division in proximity to the road from Knysna to Plettenberg Bay—in a word, all those forests which

have been easily accessible for any length of time, are completely exhausted; not because a larger quantity of useful timber has been drawn from them than they were able to produce, but because the random and careless manner of working has destroyed and wasted twenty-seven times* as much wood as has been used, and the growth of young trees handicapped beyond measure. These plants, after being opened out by the felling of neighbouring trees, only required rest to increase and grow, and they would in their turn have supplied mature timber.

'Ten years more of such management would have sufficed to strip the Colony of every forest it possesses. There would then be little indeed to be proud of in our colonial woods.

'*Regulations for arresting destruction.*—The Regulations of 1883 have, however, put a stop to this state of affairs. They enjoin that only such wood shall be cut in each forest as is fit for use, and over limited areas arranged in succession, so that when the last section of a block has been worked, the first will again be stocked with mature trees, and so on.

'*Areas prescribed for cutting.*—In the second place, they prescribe that trees shall be marked in advance for cutting in each open section, without prejudice to the future of the forest.

'These arrangements require much preliminary work. It was begun in March, 1883, and by the 31st of December in the same year, twelve blocks had been laid out, eleven sections defined, and trees marked for felling in the sections, numbering altogether 17,750, and measuring 324,953 cubic feet of good serviceable wood, and in addition, numbers of poles and spars.

'Before putting these regulations into practice, fears were expressed whether the prescribed areas would be able to supply sufficient timber to meet the demand. On this point, however,

* 'NOTE.—Twenty-seven parts wasted for one part used is not a figure of speech! It is a minimum which can be easily proved mathematically. Thus, it appears from statistics of 1878 that a "hectare" of "futaie" (timber trees) in the French Government forests produced three cubic "métres" a year, *i.e.*, about one hundred (100) cubic feet per morgen, and according to investigations made in France and Germany the annual production of a "hectare" in Europe may reach fourteen cubic "métres," or 600 cubic feet yearly. In the Colony the growth of trees is certainly quicker than in Europe, judging by the width of the rings of growth. Let us consider, however, that only the mean production, according to the statistics of 1878, is possible here, viz., 100 cubic feet

all doubts have now been removed, for at the present moment there is more material available in those parts already prepared for felling than the average consumption of the six preceding years, which, from 1877 to 1882, was at the rate of only 92,000 cubic feet per annum.

'There was indeed some ground for fear that without a more numerous staff, and more experienced in work of this nature, it would be impossible to arrange forests into blocks and sections, and to have trees marked in advance ready for felling.

'To judge of the importance of this work, it is only necessary to refer to tables of instructions which have been issued.

'*Combination of "coupes."*—To properly manage a forest (aménager une forêt) its working should be regulated for the best interests of proprietors and consumers. That is, the "coupes" should be so combined, that the largest yearly average may be drawn from the forest *for ever*, and at the same time improve its own condition.

'This is a long and difficult operation. The systematic arrangement of a single block, at an average, takes a scientific and experienced officer six months, with the assistance of several subordinates. But when the result is to obtain double the production, and often more than double, say, for example, 200 cubic feet per morgen per annum, instead of 100 feet, and that maintained at a constant figure, it certainly cannot be said that time and money are being wasted.

'Here it was impossible to undertake a work so complete without first arresting the wanton destruction going on. In order to better appreciate the value of the task accomplished, let us make a comparison. The timber cuttings had spread

per morgen. The area over which the trees in question have been cut being 25,000 morgen in extent, would have certainly produced two-and-a-half million cubic feet if it had been methodically worked; and two-and-a-half-million cubic feet could have been taken out every year *for ever*, with the certainty of always finding the same quantity of wood available in these forests. Instead of which, they have been cut down right and left without any rule or method, and have supplied a yearly average of only 92,000 cubic feet, according to the statistics of the Knysna Conservation, and the result is that these portions of our forests are completely exhausted. There is, then, only too much truth in the statement that we have wasted twenty-seven times more wood than we have used.'

throughout the open forests, like the waves of a torrent let loose over the country. My fellow labourers, working with energy and zeal, as in the presence of a plague, hurriedly formed blocks and marked trees for cutting in sections equal to one-twentieth of each block, in which to rigidly confine exploitations, as one would have dug deep channels wherein to receive and gather together the vast sheets of water inundating the country. Now that nineteen-twentieths of the forests are no longer flooded by gangs of destroying wood-cutters, attention can be directed to the best schemes for increasing their productiveness.

'*Quantity of wood increased by new system.*—Following what has been remarked before, we may safely conclude that the result of this first branch of our labours will be that each morgen of forest land will supply for general consumption more than twenty times as much timber as formerly.

'*Similar work to be done elsewhere in the Colony.*—There is indeed much work of this description to be done throughout the Colony, wherever there are any forests at all, notably at Swellendam, and in divisions of Griqualand (West), where the destruction of forests is going on at a great pace.'

A brief statement of measures taken for the demarcation and restoration of Crown forests in the Eastern divisions of the Colony follows—with more detailed notices of what was contemplated in connection with afforesting and planting of other parts of the Colony; and there are reported the measures required to secure the disposal of the timber produce of the forests to the best advantage, including notice of experiments made on the preservation of such timber by creosoting and similar processes, notices of the best season for felling, precautions to be observed in the preparation of sleepers for the railways which were being extensively constructed in the Colony, notices of Xylophagous insects destructive to growing trees and fungi, such as that occasioning dry rot, destructive to timber, and of the advantages to be anticipated from the combination of saw mills, with arrangements for the injection of anti-septics into wood. There is given an account of what might be done towards creating a demand abroad for the forest produce by sending specimens with accounts of each to the

International Forestry Exhibition in Edinburgh, for which arrangements were then being made, and the report concludes with the general remarks :—

'From these statements some idea may be formed of what has been accomplished this year; they will, at any rate, serve as a rough sketch to show those interested in the question of forestry the great extent of the work to be done for the well-being of the Colony in this respect.

'All these improvements and alterations can be successfully carried out; but it is essential that Parliament should give the matter its careful consideration, and make provision for the Honourable the Commissioner of Crown Lands and Public Works to carry out the resolution so wisely taken on the 26th June, 1883, viz. :—

'"The House of Assembly begs to inform the Honourable the Legislative Council that it has concurred in the following resolution passed by the Legislative Council:—That this House, fully alive to the importance of having a proper Forestry Department in our Civil Service, desires to urge on the Government the various recommendations of the Superintendent of Woods and Forests (G. 1—'83) lately laid on the table of this House; especially the suggestion therein submitted of sending young colonists to Nancy to be instructed in forestry for future employment in the service of this Colony, on the understanding that the proposals suggested in the said resolution will involve no expenditure of public funds, for such expenditure can, according to law and usage, only have its origin in, and be first recommended by, the House or Assembly."

'Speaking now from a practical and painstaking experience of three years, I can safely say that by no other means than those indicated can the Colony reap a real and lasting benefit from its woods and forests.'

In the reports of succeeding years are given details of the application of the measures adapted to other forests, and the progress made in the application of them to the forests of which recent mention has been made, and of results being obtained.

In that for 1884, it is stated :—

'During the year under report, clear evidence has been received of the value of Colonial woods. Well prepared and properly exhibited, they have gained the highest awards at the Edinburgh Forestry Exhibition. Immediately following this success, an order for stinkwood logs was received at Knysna from London, and enquiries have been made to the Honourable the Commissioner of Crown Lands and Public Works for samples of wood suitable for engraving purposes, fishing rods, and weavers' shuttles.

'It is well known, on the other hand, that wood used without proper precautions in felling and seasoning, has no good qualities, and is of little practical value; also that forests worked without order are quickly exhausted and finally ruined, without any adequate profit.* In order that wood may be properly prepared in the future, I have collected all the information possible as to the characteristics of sound and of defective woods; the faults and blemishes to which they are subject; and shown how wood should be properly inspected. I have fully discussed the question of the most suitable season for felling, and detailed the precautions which should be taken in drying. From all this information I have compiled a treatise, with the intention of making known and popularising the proper conditions which should be fulfilled in order to procure good sound wood.

'Tables for rapidly calculating the cubic contents of trees standing, or felled—round, or squared, have also been prepared.

'All the information relative to successful progress of forest work has been collected, so that we may be assured of finding in the forests, in perpetuity, much larger quantities of wood

* '*Exhausted.*—In the forests of George and Hamansdorp 27 times more wood has been wasted than utilised. (See Report for 1883, G. 34—'84; note page 4.) At Gouwna 100 morgen of virgin forest so treated only yielded 30,000 cubic feet of timber. (See Memorandum in Appendix to Report of "Select Committee on Railway Sleepers," page 6, and Evidence, page 36, § 321, A. 4—'84.) At this rate it would take 40,000 morgen of virgin forest to supply the 1,200,000 cubic feet required for annual consumption, and there do not exist 40,000 morgen of virgin forest in the Colony.

'*Ruined.*—The young plants of good species cannot grow into trees in forests where the refuse of past generations has been allowed to accumulate. The trees left standing stretch out their branches and stifle those which should grow to replace them. The forests of George may be instanced.'

than has heretofore been taken from them, even in the years when the greatest numbers of licenses have been issued.

'I have prepared a summary of instructions containing the first principles of forest science in operation at the present moment, and have commenced a much more complete treatise on this question, which will include the discussion of soils, climate, and species, which I trust may also be useful for other kinds of cultivation besides that of forests, and plantations of tree plants.

'All these papers have been translated by Mr Heywood, and it gives me pleasure to state that he has carefully and accurately rendered the sense of my remarks.

'In the same way as the Colony is separated into divisions, field-cornetcies, and sometimes into districts, for the administration of its general and judicial affairs, so is it necessary for the conservation, improvement, and restoration of forests, to divide the country into a certain number of forest circles called conservancies. Conservancies are again divided into sub-conservancies, ranges, and wards.

'The Colony is far from being completely organised in this respect. An important commencement has been made, and if Government considers that this portion of public wealth and capital is worthy of being preserved; that the work should be continued which has been begun; and that it is time to put a stop to wholesale wood-stealing where it is still carried on with impunity, then the only really effective method is to place at my disposal the estimates I have had the honour to submit.'

'The reports of the Conservators are appended, giving in detail the work done in the conservancies under their charge.'

In the reports of the superintendent for 1885, notice is taken of the creation of a demand for some of the woods of the Colony as a consequence of the specimens of forest produce sent to the International Forestry Exhibition in Edinburgh, of the importance of exported woods being in good condition; of a diminution both in quantity and value from £235,367 in 1882, to £67,418 in 1884, of the importation of unmanufactured wood into the Colony, and of an increase, though not so great, of unmanufactured wood from the Colony.

CHAPTER III.

REGULATIONS AND INSTRUCTIONS FOR THE MANAGEMENT OF THE FORESTS.

With the details given, it seems expedient that information should be supplied in regard to the regulations and instructions under which were conducted the operations producing these results. For some time everything was done under the regulations issued in 1875, and in accordance with these; but as has been intimated it was subsequently found necessary to introduce a change in the management of the forests, which was effected by a Government Notice, No. 406, 1883, of which the following is a copy:—

'The subjoined regulations for the working of the Crown forests, in the divisions of Knysna, George, and Humansdorp, are to take effect from the 1st June, 1883. The felling of wood growing in Crown forests shall take place with the view of obtaining the following results:—

'I. To fell the quantity of timber equal in amount to that which the forest can yield yearly in perpetuity, so that each year the quantity felled may be replaced.

'II. To assure the reproduction as quickly as possible of the best species on the parts cleared.

'With these objects the Crown forests of George and Knysna will be divided into a certain number of blocks, which will be subject to a regular scheme of management.

'In a block subject to this management, and in all those blocks where it is practicable, timber marked each year for felling shall be sold in block, in accordance with the conditions of sale for Crown forests.

'Pending the completion of the details necessary for the establishment of a regular scheme of management for working the different forests, the following regulations for the Crown forests of Knysna, George, and Humansdorp, are published for

general information, and shall take the place of all existing regulations, which are hereby cancelled:—

'1. Blocks of Crown forest permitted to be worked, will be opened in sections of one-twentieth ($\frac{1}{20}$) of the contents in one or more parts, as may be most convenient to the Forest Department.

'2. Each part will be open for two years, the rest of the forest being closed except in those parts where improvement-fellings shall be deemed necessary; but these parts shall not be open, and improvement-fellings shall not take place unless by special orders of the Superintendent of Woods and Forests.

'3. In each section the trees to be felled will be previously marked, measured, and numbered.

'4. Sections of Crown forests will be open to the public, but licenses will be issued to fell only those trees which are marked, measured, and numbered, and are of the descriptions known by the officers in charge of the forests, to be in season at the time of year when applied for, and at no other.

'5. The following shall be the rates of charge for licenses to cut timber and wood in the several forests above mentioned, viz.:—

TIMBER VALUED STANDING.

	PER CUBIC FOOT.	£	S.	D.
Upright Yellowwood,		0	0	3
Outeniqua,		0	0	1
Stinkwood,		0	1	0
Ironwood, circumference,	7 ft. or more,	0	0	1
,, do.	less than 7 ft.,	0	0	3
Assegai, do.	4½ ft. or more,	0	0	1
,, less than	4½ ft.,	0	0	3
Saffron,		0	0	3
Kershout,		0	0	2
Red Pear,		0	0	3
Witte Do.,		0	0	3
Hard Do.,		0	0	3
Vlier,		0	0	1
Guar,		0	0	1
Witte Els,		0	0	2
Red Do.,		0	0	3
Beukenhout,		0	0	2
Essenhout,		0	0	2

	£	s.	d.
Wittehout, ...	0	0	1
Other timber not specified, ...	0	0	1
Poles from 6 inches to 10 inches in diameter per running foot, ...	0	0	1
Spars from 4 inches to 6 inches in diameter per 100 running feet, ...	0	0	6
Firewood, per load, green, ...	0	5	0
Do., do., dry, ...	0	2	6

'6. Measurements of circumference will be taken at four feet from the ground in the case of seedlings; but where trees are off-shoots, they will be measured four feet from the point of separation from the old trunk.

'7. A load of firewood is the quantity necessary to fill a waggon twenty feet in length.

'*Green* firewood is restricted to trees damaged by fire or otherwise valueless as timber trees.

'*Dry* firewood is to consist of any description of tree or branches actually dry.

'8. A license to cut firewood or spars shall hold good for a period of two days.

'No timber-tree mentioned in paragraph 5 shall be cut for spars or firewood unless specially stamped previous to felling.

'9. Every license must specify the description of timber required; the number on the tree to be felled, and its measured contents of serviceable timber, also in what part of the forest the timber is to be procured, and the number of men intended to be employed in cutting the quantity specified.

'10. Every timber license will be for one hundred cubic feet (more or less).*

'11. Licenses to cut timber in any Crown forest will be obtainable at the office of the Conservator of that forest, and of such forest officers as may be authorised to issue them.

'12. When a license has been obtained to cut timber in a

* 'From the combination of the three articles, 9, 10, and 14, it results that a license is granted for each specified tree (article 9) taken in its entirety (article 14), and that the price is fixed according to the number of cubic feet of sound wood the tree contains (article 10 and 14). The whole quantity of wood furnished by the tree belongs to the bearer of the license.—Note by Superintendent of woods and forests.'

certain part of a Crown forest, it must be presented to the ranger or other proper officer of that part, previous to any wood being cut, on pain of forfeiture of the license, and in addition to any other penalty which may be imposedfor breach of these regulations. The officer aforesaid will then, unless the license has been issued by himself, register and endorse the same, and will in any case return it to the holder, who will then be at liberty to cut the wood specified in his license.

'13. The greatest care must be taken by the holder of the license that no damage be done to young trees in the process of felling and removing his timber; and carelessness in this respect will render him liable to pay compensation at the following rates for the damage done :—

Trees of circumference less than three inches.

	S.	D.
Stinkwood,	0	3
Outeniqua and trees at threepence per cubic foot, according to the rates established by Section 5 of these Regulations,	0	2
Others,	0	1

Trees of circumference of three inches and more; for every inch of circumference.

	S.	D.
Stinkwood,	0	2
Outeniqua and trees at threepence per cubic foot, according to the rates established by Section 5 of these Regulations,	0	1
Others,	0	0½

'14. No timber shall be removed from the place where it was felled, without having been previously inspected, measured, and marked by the ranger or other proper officer, who will note on the back of the license or in his register book, the contents of the timber and the date of its inspection. The measurement must include the whole length of the tree —cross-cut or not. In case of a difference of a tenth ($\frac{1}{10}$) or more between such measurement and that of the standing tree, an adjustment of the difference can be made either by a payment equivalent to the value received in excess, or by a subsequent delivery of timber equivalent to the short measure obtained by the licensee.

'15. After the felled trees have been measured, they may be

cut up in the forest or removed to the saw-pit; but the cut-up timber shall not be taken away from the forest or saw-pit until the ranger or other proper officer has marked the same in such a manner that the stamp may appear upon each piece.

'16. After the final inspection the wood-cutter will be at liberty to remove his timber either in block or in plank. If he prefer the latter, six days will be allowed for sawing one hundred (100) cubic feet; but should he intend to take out further licenses, and wish to defer the sawing until after the felling season is over, he must collect the blocks into one spot and so arrange them that the forest officer's mark may be clearly visible on each.

'17. Each holder of a license to cut one hundred cubic feet, will be entitled to take sixteen oxen to the forest and to graze them for fourteen days on the adjacent Government ground or other lands under servitude for grazing wood-cutters' cattle; after which period the oxen must be removed from the grazing ground till the wood is ready to be taken away.

'This regulation will be relaxed only in case it shall be proved that the men have been prevented from working by sickness, accidents, or bad weather.

'18. Any holder of a license contravening any of these regulations shall forfeit his license and all wood felled and not removed at the time of such forfeiture.'

The form is given. It embodies specification of the exact spot in the forest, the *Triage*, where the trees are to be procured, the number and species of the trees and cubic contents, and it is added:—

'This license is to be presented to the Forest Guard of "Triage" No. , previously to any wood being felled or removed.

'The trees must be cut low down, as close as possible to the stamp mark at the foot, care being taken to leave the stamp mark on the stump.

'The greatest care to be taken that no damage be done to other trees, according to the conditions of Art. 13 of the Regulations.

'Any breach of the above conditions will entail forfeiture of the license and other penalties which may be imposed for breach of the regulations.

'License paid, £

Conservator.'

Conservator's Office, 18

Corresponding to this is the license to cut poles, spars, and firewood; with a specification of certain kinds of trees not to be cut unless previously marked for felling by the Forest Department; and it is added:—'This license is to be presented to the Forest Guard of "Triage," No. , previously to any wood being cut, on pain of forfeiture of the license and other penalties which may be imposed for breach of the regulations.

'This license is to be returned to the Conservator, or other proper officer of that portion or "Triage" at the expiration of the period for which it is granted.

'No wood is to be cut near the sources of springs or rivers under any pretext, unless wood so situated has been specially marked for felling by the Forest Department.'

Appended to the report for 1883 were thirty documents, all of them bearing titles which indicated their relating to matters of great importance, but they were reported to be too voluminous to admit of their being printed in time for presentation to Parliament during the approaching session; and four only were printed. One of these was a Summary of Instructions issued to forest officials on the introduction of the new regulations.

In the Summary of Instructions there are given in Part I. general observations, comprising the following conditions of a systematic treatment of forests, in accordance with the advanced forest economy of the day:—

'CONDITIONS OF SYSTEMATIC TREATMENT.

'The regulations of 1889 begin with some remarks from a technical point of view, on the general principles of forest treatment:—

'"To fell the quantity of timber equal in amount to that which the forest can yield annually in perpetuity, so that each year the quantity may be replaced.

'"To assure the reproduction, as quickly as possible, of the best species on the parts cleared."

'There is here ennunciated the economic proposition that a Crown forest, in its land and in its wood, constitutes a capital belonging to the community at large—a community which it is essential to consider as being imperishable. This capital should be husbanded, improved, and increased in proportion to its utility, and above all, to the influence which this class of property may exercise on the climate and wealth of a country. This capital is composed of the value of the soil, plus the value of the wood covering it. Trees increase in bulk and form, thus each year a certain number of cubic feet of wood is added. If on any one plot of ground there are too many trees, the growth will be proportionately less. If there are vacant places in the plot the sum of the growths will not be as large as if the whole surface was completely covered by trees. And, lastly, if the plot is wooded with over-mature trees, the sum of the growth will be smaller than where the plot is furnished with trees in full vigour of growth. Thus, for a given surface there is a certain quantity and arrangement of trees that will give the greatest possible yield, and the capital, in its two-fold sense, of the land and the wood which it carries, should be brought to that point at which the greatest possible yield can be realised.

'If from a forest producing each year a certain number of cubic feet of wood, no more is removed per year than a quantity equal to that which has been formed, the capital remains intact. Exactly as on a farm capable, for instance, of only carrying 1000 head of cattle, and on which 100 head of cattle are raised per year, if not more than 100 head of cattle are used during the course of the year the capital may be said to remain intact. If then the capital is complete, *i.e.*, if the land is properly covered with wood, or the forest fully and suitably stocked with trees, the annual yield, like the harvest from cultivated land, may be legitimately credited to the general

revenue and expenditure of each year, to be applied for the benefit of the community.

'Thus (1st.) a forest should be worked so that in any one locality a young and better growth may succeed the old forest which has been cut down.

'(2nd.) The quantity of wood cut each year ought to be such that the forest may be maintained at the maximum of production, and, this point reached, no more wood should be cut than is annually produced.

(3rd.) All trees should be utilised and turned to profit except those required for the conservation, productiveness, and improvement of the forest.

(1.) *Reproduction of Forest.*

'The following conditions require to be fulfilled in the reproduction of a block of mature high forest:—

'1st. A complete sowing (ensemencement) of the ground.

'2nd. Protection of the soil from the action of the sun.

'3rd. Shelter to the young plants for the first few years of their existence.

'4th. Atmospheric influence allowed to act gradually on the young plants, according to the individual temperament of the species.

'These four conditions are ordinarily realised in practice by means of three successive "coupes," or cuttings, following one another over the same ground at short intervals of time.'

These successive fellings are described with reasons for each, and for its being executed in the way prescribed. It is next stated and illustrated in a similar way, that in order to fix the quantity of wood which may be cut each year in a forest in order to have the same quantity available—this quantity being the greatest possible annual yield of the forest—account must be taken of—

1st. The area of the forest. 2nd. The material or trees on the ground. 3rd. The age at which they are exploitable. And this is followed by remarks on the sale of forest products.

Next there are discussed in a similar manner the old method of working the forests of the Colony, and its consequences;

and the problem to be solved, viz.—How to treat the forests as to secure the three objects aimed at, which have been stated above.

And under the head of Practical Details are given some twenty instructions, fully and explicitly stated, for the guidance of the forester.

A second appendix to the report comprised instructions in regard to the marking of trees in a *coupe*, or felling, as a preliminary to which it is stated:—

'Trees for felling should be distinguished and marked before being cut down: on this point opinion is unanimous, almost intuitively.

'But when persons entrusted with the selection and marking of trees for felling have nothing to guide them but their instinctive ideas, it follows they would naturally be led to mark the trees the wood-cutters themselves would have chosen, not wishing to act by caprice or partiality, which would be worse still. In this latter case their work would be entirely useless, their expenses thrown away, and they would become unconsciously responsible for the ruin of the forests.'

Illustrations amounting to a demonstration of this are given, followed by diagrams and formulas to be used in recording and reporting the work done.

A third appendix related to the demarcation of forests, in regard to which it is remarked:—

'Just as in order to render the land of any country valuable by means of agriculture, the first operation is to measure and mark off farms, that is, the areas within whose limits the agriculturist may sow, plant, and reap his crops; raise his cattle; and protect the interests concerned; so in logical sequence the first work to be undertaken for conserving and restoring forests is to accurately mark out those areas belonging to Government, which should be set aside for production, exploitation, and forest culture, and the extent determined to which the necessary measures can be applied for their good management.

'These areas are "Forest Reserves."'

And there were added demarcations of three sections of forests in King William's Town, and demarcations of six sections in Stockenstrom.

In a fourth appendix were supplied instructions in regard to clauses and conditions of sales, and of exploitation of wood in blocks of forests—by exploitation being understood everything relating to the felling, the cutting up, and squaring of timber, and the removal of this from the forest.

Another related to the re-foresting of burnt patches of forest lands by temporary concessions—unfolding the scheme, and stating the conditions. And several related to experiments with Colonial wood to ascertain their suitability for use as railway sleepers, and the improvement of this by saturation with sulphate of copper, with creosite, and other anticeptics.

In 1885 there was published a small treatise by the superintendent, entitled *Introduction of Systematic Treatment of the Crown Forests of the Cape Colony: a Summary of Rules and Instructions.* There are embodied in this some of the instructions already cited; but combined with these are many more.

The instructions are arranged under different heads, with explanations of the spirit and motive under which those of the different categories had been prepared, and showing, step by step, the course to be pursued to gain the desired end. To give them *in extenso* is out of the question, and to abridge them is equally so; but an enumeration of them, with cursory remarks, may indicate the progress which was being made in the development of the forestal wealth of the Colony the first are thosewhich have been cited, relative to the principles which it is expedient should be borne in mind in working forests in accordance with the regulations of 1883.

The second set of instructions are those cited in regard to the marking of trees in a *coupe* or felling.

The instructions under the third heading relate to the supervision of sections of the forest. In these are given, apparently, all the instructions an officer in charge of a section would require in his supervision of this.

Under a fourth heading are given instructions relative to the preparation of an inventory of standing stock. These are explicit, and illustrated by diagrams, and formulas to be employed in records. They are preceded by the following general observations:—

'In order to determine the quantity of wood which may be annually felled in a forest, so that it may not become exhausted, but that its yield may be raised to its maximum production, we must know the area of the forest, and of what its stock of trees consists; such statistics are invaluable when enquiries are made as to the quantity of wood available for special purposes, as, for instance, sleepers, engraving, fishing rods, weavers' shuttles, &c.

'To make a perfectly exact inventory it would be necessary to procure a return of all trees existing in the forest. Such an operation would be practically impossible in many places, especially in the Colony, and is not necessary. It suffices generally to divide a forest into plots, as homogeneous as possible as regards soil, situations, and "peuplement," * and an exact plan is made of these divisions. The plots are selected which should be first regenerated † in a certain number of years, called a period. The poles, spars, and trees of each species are counted, the diameter and height of each tree measured, and an exact return is made of the contents of these plots only. The others are taken at an average obtained from sample representative areas carefully selected. This method takes much more labour than can be devoted to it, when destruction has to be stopped suddenly, without at the same time entirely suspending the felling of timber. In the event of an approximate return being required quickly and inexpensively, a mere summary valuation suffices.

'It is necessary to make inquiry into the rate of growth of trees in order to ascertain the time which must elapse for a plant to become successively a pole, a middle-aged tree, a mature tree, and finally a declining tree; to ascertain the area

* "Peuplement."—Number, species, and distribution of all vegetable productions.

† "Regenerate."—To remove old trees and replace them by young re-growth.

of ground it requires at each of these stages; and to procure data on the form, volume, and corresponding qualities at the different periods of development.

'Without this knowledge it is not possible to judiciously mark trees for felling, or to reserve those required for the conservation of the forest. Neither would it be possible to judge when the mature trees of the same plot should again be worked, as these data can alone determine the quantity of wood which may be annually cut in the forest, and at the same time preserve and improve it, so that gradually it may be brought to its highest point of productiveness.

'To ascertain the rate of growth, two methods of investigation are employed. The first is the periodic and continuous observation of standing trees, the other the careful examination of the structure of felled trees.

'The observation of growing trees is made by noting every season the increase in girth of individuals of different ages growing in various localities.

'The examination of felled trees determines the shape, thickness, and composition of the layers; the proportion of heartwood, sapwood, and bark; the shape of trees; their actual contents; their serviceable contents; the area of ground they cover. Taken in conjunction with the statistics collected concerning growing trees, this information supplies the means for determining the influence of the soil, climatic surroundings, the cause of certain growths; and together they reveal to us the laws followed, and enable us to ascertain the time required by nature to bring wood to different degrees of perfection; and to determine the age and ordinary development of trees found under varying conditions.

'For useful reference the statistics thus collected should be carefully and methodically registered.'

There follow directions relative to the observations to be made on standing trees; observations to be made on felled trees, with formulas and illustrative diagrams.

Under a sixth heading are given instructions in regard to external signs of maturity and soundness, and of restricted development and defects.

Under a seventh heading instructions are given in regard to the inspection of wood, with the general view of determining its suitableness or otherwise for various requirements, and to ascertain if it fulfils the special conditions of certain contracts, and determining whether it should be rejected or admitted and classed in its proper category. There are specified what observations are to be made, how to make them, and how to state results in the note book, numerous diagrams being given in illustration.

Under the ninth head are given instructions the following in regard to management, &c. :—

'Management ("Aménagement") comprises the arrangement of "coupes" and the regulation of works in such a manner that the annual yield of a forest may be as constant as possible, and that its production may be brought to the highest possible point. A complete and definite management scheme embraces a series of operations which can only be successfully undertaken when the necessary resources, both as regards staff and money, are at command, and when the products of the forests are certain of being utilised.

'There are pine forests in Europe, systematically managed, which annually produce nearly 14 cubic metres per hectare, or about 500 cubic feet per morgen.

'According to the statistics of 1877, the annual revenue in cash varies from 53f. to 158f. per hectare, or between £2 and £6 per morgen.

'M. Tassy,* the most competent man in France on the question of management, states that the average production of high forest properly treated, in that country, is 6 cubic metres per hectare, or about 200 cubic feet per morgen.

'There can be no doubt this figure may be easily attained by the forests of the Colony, when we consider that stinkwood grows more quickly than any species in Europe. At this rate

* "Etudes sur l'aménagement des Forêsts," by M. Tassy, formerly Conservator of Forests, who, after having undertaken important missions on forestry in Algeria and Turkey, has filled with much distinction the high position of "Verificateur General des Aménagements" in France.

the forests of the Knysna Conservancy, about 50,000 morgen in area, would produce 10 million cubic feet of sound wood per annum; say 5 million feet of serviceable wood, of which one-eighth, being stinkwood, would represent an annual return of £30,000; other timber and waggon-wood, £30,000; total, £60,000.

'Would the expenses for attaining this result amount to £20,000? Even then the investment would be still far from unremunerative.

'When circumstances do not admit of a complete management scheme (Aménagement), a working plan may be framed to prevent the utter ruin of forests, and also greatly improve their value, thus in some measure approaching the condition in which it would be most desirable to see them.

'*Perfect management* is the end in view of the regulations of 1883, and in awaiting it, a *preliminary* and *transitory management* has been proceeded with.'

There follow the instructions with illustrative examples, and descriptions of ledger and of atlas of charts with specifications of the entries to be made under successive chapters, and a memorandum of the method to be followed in parcelling out a forest correctly, with examples of tables to be prepared, containing respectively (1) a tabulated description of forest plots; (2) the formation of series, and working plan to be followed in each forest; and (3) the quantity of wood available each year in accordance with that working plan.

Under heading 10 are given the instructions in regard to clauses and conditions of sale, and of exploitation of wood in blocks of Crown forest, already cited.

Under heading 11 are given instructions relative to the temporary cultivation of forest and devastated forest land (already cited), preceeded by the following preliminary remarks:—

'It frequently happens that certain parts of burnt or devastated forest land require tilling before they can be successfully reforested. In such cases it is beneficial to the forests, and advantageous to certain inhabitants residing in their neigh-

bourhood, that agreements should be entered into for such forest culture.

'The natural compost of burnt patches is usually exhausted by a continuous cultivation of seven years. It is desirable that this should not be entirely exhausted by such tillage, but that about one-half should remain in the soil. For this reason a system of tenure for four years has been proposed.

'The conditions to be imposed by the following schemes contain all necessary precautions for the well-being of the forests.

'In some instances, portions of such lands have been already dug or ploughed; then one or two years may suffice for further cultivation. Frequently this is so in the eastern district; and conditions are imposed as stated in the agreements entered into in the King William's Town division.'

And there was appended a copy of the regulations to which these instructions referred, those issued in 1883, of which a copy has been given above [*ante* p. 233].

In the same year there was published by authority a similar small work entitled *Selection and Seasoning of Wood*, by the Superintendent of Woods and Forests in the Colony, which embodies in appropriate connections some of the matter embodied in these instructions, but in combination with this much besides, which likewise indicates the development and advancement which forestry had taken in the Colony. The manual comprises observations on the—

Structure and composition of wood. Faults and defects of wood. Inspection of wood. External signs of maturity and soundness. Time for felling. Quantity of water. Action of temperature and time on evaporation and drying. Influence of season in relation to the nature and proportion of substances entering into the composition of wood. Influence of season on the changes which immediately follow felling. Effects of barking trees. Precautions to be taken for properly seasoning wood. Influence of seasoning on the durability of wood. Identification of wood. And in an Appendix are given: Example of

completed contract. *Pro formâ* conditions for classification of logs. Precautions observed in preparing Colonial wood for the railway department. Instructions for inspection of Colonial wood. Special instructions concerning stinkwood logs. Shipment of wood. Explanations for filling in note-book. Forms of inspector's note-book.

Under the head of Faults and Defects in Wood there are discussed these :—

1. Knots. 2. Irregularity in layers of growth. 3. Spiral grain. 4. "Coltiness" (defects caused by weather.) 5. Cup-shake ("roulure.") 6. Ring-gall ("frotture.") 7. Heart-shake. 8. Star-shake ("cadranure.") 9. Red rot. 10. White rot. 11. Grey rot ("Grisette,") and dry rot. 12. Wet rot—black rot. 13. Blemishes at the butt when standing. 14. Double sap-wood ("Lunure.") 15. Attack of worms.

CHAPTER IV.

RESULTS IN DIFFERENT FORESTS FOLLOWING OPERATIONS IN ACCORDANCE WITH THE REGULATIONS AND INSTRUCTIONS ISSUED.

EVERY year there has been appended to the report of the Superintendent reports received from Conservators and other officers of all operations carried on by them or under their direction. The following are adduced solely as indicative of what was experienced and effected in carrying out the regulations and instructions which have been cited:—

Two only are adduced. The forests of the Knysna, the most extensive on the southern coast of the Colony, and the forests of British Kaffraria, the most extensive on the eastern coast.

SECTION I.—FORESTS OF THE KNYSNA.

The forests of the Knysna include those of George, the Knysna, Plettenberg Bay, the Zitzikamma, and others in the division of Humansdorp.

In the report made by the Conservator, Captain Harison, for 1883, the third year of the new regeme, it is stated: –

'The revenue has fallen off £325 3s, as compared with last year, and the causes are not difficult to fathom. The timber trade in all its branches is at a standstill; added to this, the transition between the old and new regulations.*

* The depression of trade has pressed heavily on all the forests of the Colony. In the neighbouring forest circle (Alexandria and adjacent forests), and in the forest Conservancy of King William's Town, not the slightest alteration has been made in the old regulations, or forest rights. Despite this, the receipts at Alexandria have fallen from £433 9s to £143 8s 8d, which is a decrease of over $\frac{2}{3}$ for the year 1883. In the forest Conservancy of King William's Town the total has fallen from £3,903 4s to £1,789 15s 7d, a decrease of almost $\frac{2}{5}$ for 1883. In the Conservancy of Knysna, where the new regulations have been put into force, the receipts have fallen from £2,406 10s 7d to £1,489 15s 4d, a little less than $\frac{2}{5}$—or if the value of wood used by the Public Works Department be deducted, the value of licenses issued has fallen

'Those who were inclined to work were deterred by the exaggerated statements of the restrictions to be placed on the wood-cutters.

'The accompaning plan will show the amount of work done by the Department in surveying, sectioning, and cutting of boundary lines between the Government and private forests.

'Considering that the work was new to us all, I believe I quote your own words, "that the sectioning and marking of trees was fairly done."

'Selecting trees for felling is the work of trained foresters; here we had but one such, Mr Rawbone, to train our inexperienced hands, and it need not excite surprise if mistakes were made at the commencement. My able and willing assistants, Messrs Rawbone and Fourcade, soon taught the most intelligent men the first principles to be attended to, and after the completion of the first sections, we had men capable of taking charge of the marking parties.

'It is satisfactory to find that the Government has determined to use colonial woods for the railway and other public departments. With the Colonial bullock-waggons before us, it is superfluous to argue on the durability of our timber. The great mistake hitherto has been the neglect of proper seasoning, attributable in a great measure to a want of foresight in not ordering timber before it is required for immediate use.

'I regret that the new regulations are not popular, but it is not to be wondered at. It is a sudden leap from comparative freedom of action to close "knee-haltering," and the restraint will be irksome at first. A few are feeling their way, and I have little doubt that so soon as there is a demand for timber

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from £1,706 18s 3d to £1,003 14s:—that is to say, the decrease for 1883 is much less than $\frac{1}{2}$—about $\frac{2}{5}$.

On comparing these results it will be seen that the proportion of decrease is very much less for the Knysna than for the other forest divisions of the Colony during the year. Looking at these facts, it is fair to conclude that the introduction of the new system of working the forests, and the enforcing of new regulations, have, to say the least, had no adverse influence on the returns. (Note by the Superintendent of Woods and Forests.)

the wood-cutters will go to work, and be surprised to find that, though subject to some inconvenience and delay in procuring their licenses, the new rules are much in their favour.

'The plantation at Concordia is thriving; some two thousand oaks are looking well, whilst about five acres of stone pine are growing vigorously. I tried Cinchona, kindly supplied by the Indian Forest Department, but have not been successful; however, I know the cause of failure, and shall renew the experiment in May. At the Gouna forest, forest guard Brown has successively transplanted a few stinkwoods—hitherto a doubtful question. They will thrive in old forest soil, but in my opinion will never answer on a large scale, neither does it appear necessary, when we have thousands of young plants in the forests only requiring light and air (which the present system of felling will give them), to grow up rapidly and keep up the supply. We have completed sufficient sections in the George and Knysna forests for present requirements, and Mr Rawbone has proceeded to near Storms River, there to commence sectioning the virgin forests between Blauwkrantz and Storms River, whilst Mr Fourcade takes the area between the Salt and Blauwkrantz Rivers.

'The old Zitzikamma forest has been worked for nearly 80 years, and is thoroughly cleared out of mature timber. It should be closed to recover itself. The George forests are in the same condition, and only one section has been opened to give employment to the wood-cutters. The system of allotments to wood-cutters, as carried out in George and Knysna divisions, cannot but better the condition of these people. They have now an inducement to cultivate land and make comfortable homes, which hitherto was denied them, through their having no claim to the land they occupied. I would strongly urge that the system be extended to the Zitzikamma (east of Storms River), where there is a large population at present squatting in front of the forests, and who will otherwise suffer hardship when the forests are closed.'

To the report from the Knysna for 1884 there is annexed a

tabulated statement of each description of wood supplied from the forest; and the Conservator remarks:—

'With the exception of a few hundred feet of stinkwood, the only demand for timber from the Crown forests last year was to supply a small contract for yellowwood sleepers for Natal, two contracts of yellowwood logs for the railway department, and lastly several small contracts for yellowwood sleepers—about 10,000 in all—to start the creosoting apparatus. A contract for stinkwood logs was taken up by a forest proprietor. The arrangements calling for tenders for the supply of sleepers were unavoidably delayed till within a few days of the close season, the strain on the department, by condensing several weeks' work into a few days, was rather a trying start for the new regulations, and was a good test of the practical working of them, commencing with a rush for licenses to fell, to the final inspection of the manufactured timber. Judging from the general expression of opinion the regulations work satisfactorily. To the illiterate wood-cutter, not able to read the numbers on the trees, some additional trouble is given before he can procure his license. Often they make drawings of the figures they cannot read, but the rangers and guards of sections always render every assistance by accompanying the workmen in the sections to the requisite points, and furnishing them with an exact list of trees selected by them. If trees do not contain the number of cubic feet they are said to contain wood-cutters immediately receive the compensation they are entitled to on drawing attention to the fact (according to Article 15 of General Instructions.) But cases of this kind have very seldom occurred. When there has been any deficiency it has arisen because the wood-cutters have felled the tree too high from the ground, contrary to instructions, thus losing three or more feet at the thickest part of the bole; or they have abandoned as waste wood a length of three or four feet of sound wood near the junction of the branches, when the bole has been cut into lengths for sleepers.

'The sound wood, however, is not estimated to produce so many sleepers, but a certain number of cubic feet of sound timber, and it is for the purchaser of the tree to take away and

otherwise appropriate those sound portions which cannot be utilized for sleepers.

'If the manufacture of sleepers is to be carried out on a large scale, it must be obvious that the timber used should not be restricted to yellowwood. The supply of timber for 100,000 sleepers annually was based on the assumption that the sections would be cleared of all mature marked trees; but if only one sort is taken the present sound system of forestry will be heavily handicapped, and our mature yellowwood be exhausted.

'It should be borne in mind that yellowwood is the only wood we possess in general use for domestic purposes, house building, &c. (Witte els is occasionally used for ceiling boards, but rarely.) In fact yellowwood is our Colonial deal, and if we exhaust the supply for sleepers we shall be dependent on imports for every door and window we put up. Judging from the reports on creosoting our woods, it would appear that nearly every description is rendered equally durable by the process—in that case why restrict the supply to our most useful timber, when we have others in abundance that will answer for sleepers equally well.'

There is reported what sections of the forests were open for fellings, with a numerical statement of the number of trees, and of the cubic measurement of these, on several of those calculations being prosecuted diligently in regard to these in the others.

There was also given a report of what had been done at Humansdorp forests, comprising the area, and a series of projected successive fellings of sections, with the estimated cubic measurements and pecuniary value of the timber marked and available in three of these sections, and with the proportional measurements of the different kinds of woods in them. And the Conservator, Mr. J. Rawbone, reported :—

'I have the honour to submit my annual report on the forests under my charge.

'Appended is a statement of the timber felled, and the revenue received, for the year 1884.

'The forests east of Storms River have been closed, being completely exhausted, and licenses only issued for the felled timber on the clearings made by the Public Works Department for the construction of the road through the Zitzikamma.

'On taking over the charge of this division, I immediately commenced the survey of the forests of Elands River, Klein River, and Witklip, and their formation into series, and by 24th May one section was completed and opened for working; but owing to the difficulties of transport across the Storms River, through which the road had not been carried, and the small demand and low prices paid for timber, bush-cutters did not avail themselves of this section until one month before the closing of the season, when timber to the value of half the annual revenue was felled.

'The new regulations have been strictly carried out in this division, and I experienced much less difficulty in carrying them out than I had at first expected, owing to the usual prejudice that always exists against innovations of any kind. One of the many advantages of this system is that it localises fellings. Formerly, a wood-cutter took out a license for a certain forest; perhaps a tree near the edge of the bush may suit him; more probably, in his wanderings after buck, or honey, a particular tree, perhaps two miles in the forest, has taken his fancy, to get out which he must cut two miles of *slid-path;* that is to say, he devastates an area of nearly two acres; this is no exaggeration, as every one in this district well knows. It may be argued that no timber is damaged; but what of the seedlings and young saplings, which are the future of the forests?'

There follow statements of the forests surveyed, and the series and sections formed in the course of the year; the cubic measurement and estimated value of the different kinds of trees marked and available in these, with other details; and the report proceeds:—

'The forests to the east of Storms River can bear no further felling without endangering them. I am of opinion that these should be kept closed at present until the "management schemes" of the forests to the west of Storms River are

completed, when they could be taken in hand, surveyed, and demarcated.

'In addition to these forests, there are a few scattered patches lying in the kloofs among the mountains, for the most part scrub and kripple bush, and generally inaccessible; these must be strictly conserved from fire and grazing, as they have even a greater influence on the climate than the more extensive forests on the flats, and although at present we cannot complain of want of water in this district, still we must not lose sight of the fact that the disappearance of similar patches of scrub has been the precursor of the drying up of mountain springs in other parts of the Colony.

'Of the 7,072 morgen of workable forests, 3,750 morgen are virgin forest.

'These forests contain a large quantity of standing mature timber, which, if left on the ground, will deteriorate in value.

'If these trees have to await their turn to be felled, many will have perished, the rest will be non-marketable.

'The superintendent in his report for the year 1881, refers to this question of the disposal of superfluous timber in these words:—

'"It might be advantageous to use this superabundant material, the accumulation of centuries, and it is certainly necessary to free the forests of it, proceeding carefully, cautiously, and steadily."

'If, then, the demand should exceed the supply from the sections opened, a large quantity of timber can be counted on, resulting from the felling of mature timber in the unopened sections, until the forests to the east of Storms River shall have so far improved as to be fit to be worked.

'The probabilities of the demand exceeding the supply I think, are but very small, judging from the returns for this division, during the last few years; even with the advantage of thorough communication east and west. Unless the Government intend drawing a portion of the supply of Colonial sleepers from these forests, a large quantity of valuable timber, I fear, will again be allowed to go to waste, while undue pressure will be put upon the Knysna forests.

'In the waste Crown lands, east of Storms River, there are about 50 families of squatters, each family cultivating 2 or 3 acres of burnt bush soil around the forests; some are wood-cutters, others gain a precarious livelihood by fishing; it is of course highly necessary to get rid of these squatters—but one would hardly feel justified in turning them off the ground, after having tolerated them for so many years, without some provision being made for them.

'As the forests on this side are closed, I should propose that the bush-cutter portion of this population should be given locations on the west side of the river in as central a position as possible convenient to working the forests: at Lottering for instance, where there is about 500 morgen of burnt bush soil, suitable for gardens, and where they would also be under the immediate surveillance of the forest guard, who is stationed at Lottering; allotments to be granted them on the same system as carried out in the George and Knysna; they would then have some inducement to cultivate their land and make comfortable homes, which at present they cannot do, owing to their having no claim to the ground they occupy.

'There yet remain many patches of burnt bush running up into the forests, which it would be most desirable to re-forest, not yet under cultivation; I would therefore propose that the rest of the squatters should be removed from the land they are occupying and be granted say 2 or 3 acres of this burnt bush land, with the right of cultivating during 3 or 4 years, to be then handed back to the forest department for re-foresting, and another 2 or 3 acres granted them, and so on until the whole of the burnt bush around the forests shall be re-forested.

'With the ground cleared and worked up, planting could be undertaken at a trifling expense; plants could be obtained from the neighbouring forests, or better still, a nursery could be established at Witte Els Bush, for the raising of indigenous and foreign species, where it would be under the immediate charge of the ranger, who, I believe, has had some experience in plantation work.

'Special attention ought to be paid to the raising of stinkwood; the superintendent gives it as his opinion that the

country between Storms River and Witte Els Bush is the finest field for production which can be found in the whole of the Colony; its qualities are beyond dispute, and trees of any size are now becoming very scarce; it is also one of the fastest growing trees, if not the fastest, in the indigenous forests.

'According to instructions received, I took over the charge and management of the "Plaat Bush" from the forest ranger, Mr Lloyd.

'This forest has been surveyed by Mr Fourcade, and one series and section formed, containing in valuable timber 20,416 cubic feet, valued at £202 8s 1d.

'The forest is, I believe, capable of being formed into 3 series.'

In regard to the Knysna it was reported by the Conservator, Captain Harison, in 1885:—

'I have the honour herewith to furnish a report on the Crown forests under my charge for the year 1885.

'The accompanying statement will shew the revenue for the year, the quantity of timber felled, and the timber available in the open sections for this season.

'The revenue shows a slight increase over last year, due to the demand for yellowwood to supply sleepers for the factory, otherwise there has been but little timber felled for other purposes. It is, however, encouraging to see shipments from some of the old stocks on hand, which would justify the conclusion that there is a slight revival in the timber trade. The hopes of this district, and that of Humansdorp, are centered on the sleeper factory. The Crown forests are estimated to supply 100,000 annually, but this present restriction of material to the two sorts of yellowwood is too heavy a strain, and the supply of so large a number cannot be maintained in perpetuity as estimated by the Superintendent of Woods and Forests. His calculations were based on the supposition that every description of timber would be used for sleepers, and in that case 300,000 to 400,000 cubic feet could be supplied without injury to the forests.

'The work in re-forestering during the year shows steady

progress in carrying out the superintendent's system in its entirety. Mr Fourcade has cut and marked two sections at Sour Flats forest, and has framed plans from actual survey of the forests situated between the sources of the Gowna and the Homtini Rivers, and so soon as we have working plans of all our forests completed, one section in every "series" can be opened at any time to meet a sudden demand should such occur.

'Mr Cooper has cut and marked one section at Groot Brak and one in the main forest. He has framed a working plan for actual survey of the whole "Groot Brak" forests, has cut lines of demarcation between Government and private property—some 20 miles have now been cut. Since November he has been engaged on survey to frame a working plan of the forests between Forest Hall and Groot River. This is now completed.

'Mr. Rawbone has been employed on survey to frame a working plan of the extensive virgin forests between Blaukrantz and Lottering Rivers. This is now completed, and he has nearly completed a similar work between Blaukrantz and Groot River to connect his work with Mr Cooper's. This officer has rendered good service by voluntarily undertaking to inspect sleepers for this factory at Knysna, worked under contract in the Zitzikamma. Some 2,500 have passed through his hands, and, by thus giving a start to the industry, it is estimated that 30,000 annually could be supplied from these forests. The increase of the license fee on Outeniqua from 1d to 3d will, I fear, prove a temporary check, though this has been in a measure removed by the fact that the Humansdorp men have tendered for 16,000. Mr. Rawbone was entrusted to superintend the preparation of timber specimens for the Indian and Colonial Exhibition, which, with few exceptions, were collected by him.

'Charcoal-burning has been tried, and the different systems of railways have been supplied with 10,000 lbs. This has not yet been reported on, but from the reports made on a small sample supplied I have every reason to believe the coal to be of the best quality. The accounts have not yet been made up but I am sure it will prove a paying forest-product.

'Tenders for the supply of sleepers to the factory have been called for, and it is surmised that a large number will be offered. Money for license fees appears to be forthcoming this season, and doubtless all the available and suitable yellowwood will be utilised for this purpose, and produce a considerable revenue. There is of course an outcry that the timber supply of the Crown forests is too limited, and that the sections are inconveniently situated. The calculations of the superintendent to supply timber in perpetuity are based on sound principles, and if his rotation system be relaxed the forests will be overworked. Many of the sections are some distance from roads, but this in nearly every case is necessary from the most accessible timber having been removed, and also that this rotation was commenced at the eastern end of the "series" to advance the sections against the dominant wind.

'I may safely estimate the revenue from the forest under my charge for this year to exceed £2,500. On the whole the forest country cannot but be too thankful for the benefits derived and the relief afforded by the circulation of ready money paid by the Government for sleepers. If the profits are small, to many the sleeper money has been salvation from ruin, but to all it has proved to be "the turn of the tide."'

There was appended a tabulated statement of the revenue received, and of the quantity of wood felled in 1885; and a description with statement of the quantity and value of the timber available for 1886; and one or two important annexures. One of these was the following report by Mr Rawbone, the officer in charge of the Humansdorp forests:—

'The three sections opened in this division have been more than sufficient for the demands of the bush-cutters, one-fourth only of the trees marked as fit for felling having been required.

'The demand for timber is still very low, and the profit to be made from waggon-wood, yellowwood, and stinkwood planks in the eastern districts so small, that had it not been for the assistance they obtained from working sleepers, their condition would have been worse than last year and the year preceding.

'In my report for the year 1884 I drew your attention to the number of families of bush-cutters and others squatting around the forests on the east side of Storms River; some of these have occupied the ground for many years; another year has gone by, but still nothing has been done in this matter, and all that I have been able to do is to prevent others coming in. The Zitzikamma seems to be looked upon as a "no man's land," and any attempt to dispossess them of the land they have taken possession of is deeply resented, and it must be admitted, with a great deal of right on their side; many would be most willing to purchase the land on which they are squatting or some other, so as to have a home of their own, rather than be, as at present, exposed to be turned out at any moment.

'If these squatters were under some authority, they might be tempted to build better cottages and improve their holdings, to their own advantage and for the good of the district at large; it can be hardly expected that they would do so, when they have no right to the land, and are liable to have the labour of years forfeited at any time. When markets are good, and prices rule high, they have no need to grow their own produce, but in times of depression like the present, there being no demand for timber, their gardens alone keep them from starvation.

'The following is a statement of the forests surveyed, and of which plans have been prepared, up to the end of the year 1885:—

Elands Bush Forest	...	...	...	1,250	morgen.
Klein Bush do	...	...	...	195	,,
Witklip Bush do	...	...	...	777	,,
Blaukrantz and Lottering Forest			...	3,384	,,

demarcated area; of which 2,582 is virgin forest.

'The survey and demarcation of part of Plaat Bush and Groot River forest is now being proceeded with. One series has already been surveyed off by Mr Fourcade, and the remainder of the forest is capable of being formed into two series.

'No new sections have been opened this year; as stated above, the three at present open being more than sufficient for the requirements of the bush-cutters.

'The land lying between the main road and the sea, and between the Rivers Blaukrantz and Storms River, has this year been cut up into farms for the Government by Mr Surveyor Newdigate the small patches in the open, and along the course of the rivers, have been reserved, and regular boundaries given to them, which include hookies and gaps in the boundary of the forest.

'With your instructions, the Fyne Bush skirting the forest has been burnt each season, and is gradually disappearing around their perimeters.

'Around the forest west of Storms River this can easily be done, as they are chiefly virgin, and the fire can with difficulty penetrate; but east of Storms River, where the forests are for the most part worked out, the operation becomes more dangerous, and greater care has to be taken in selecting proper days on which to burn, favourable winds, &c.

'There is an increase in the revenue of some forty pounds: this amount is obtained from the license fees on about 2,500 sleepers supplied by the bush-cutters of the district for the sleeper factory at Knysna. At the desire of the bush-cutters, and with the consent of Mr. Dunn, the superintendent, I inspected the sleepers on the saw-pits, so as to save them the loss they would otherwise have been put to in transporting sleepers for which they would not have been paid for in the Knysna.

'Even with this assistance, but small profits could have been made in the industry owing to the distance of road transport, more than fifty miles, and it is much to be regretted that transport by sea could not be arranged from either the Storms River or Salt River mouths.

'By computation, I estimate that about 30,000 sleepers could be cut out of the forests of the districts per annum, without exceeding their possibility; this does not include Groot River or the Salt River series, so that it would be well worth while forming a cheaper method of transport, other than the ox-waggon, which at present swallows up most of the profits.

'By Government Notice No 23, 1886, it is notified that, after the 16th January, 1886, the rate of charges to cut

Outeniqua yellowwood in the Crown forests of George, Knysna, and Humansdorp, shall be 3d instead of 1d per cubic foot as heretofore.

'This equalising of prices was most desirable; which is the better of the two woods is doubtful, at all events the Government made no distinction in the price of Outeniqua or Upright yellowwood sleepers, and turning to figures we find that 9,321 cubic feet of Outeniqua were felled against 3,336 cubic feet of Upright, and the latter did not need protection on account of its scarcity, as the former is much more plentiful than the latter; therefore the difference in price was unreasonable. Still this rise in the license fee of 2d per foot bears heavily on the bush-cutters of this district, and is certain to crush the sleeper industry, small profits were only to be made before, but with this addition (only Outeniqua sleepers were worked in this district) and no corresponding increase in the price given for the sleepers, the balance would be against the bush-cutter.

'In Knysna there are private owners of forests to fall back upon, but here the Crown owns everything; again we might ask why timber at a distance of 54 miles from a port should pay the same license fee as timber close by; if the Knysna forests, for instance, were situated around Cape Town, would the Government be satisfied with 3d a foot?

'I would therefore suggest that the license fee on Upright and Outeniqua yellowwood be made 2d per foot for the Zitzikamma, which would bring a higher revenue than formerly when Upright was 3d and Outeniqua was 1d, as both woods would be equally worked instead of a great demand for one and none for the other, thus a quantity of wood might be profitably cut to the improvement of the forest (culturally), the advantage of the revenue, and the good of this district.

'In support of my suggestion, I must beg to remind you that there is already a precedent in existence for the change. Last year the Government deemed it expedient to reduce the license fee of stinkwood from one shilling, as in the Knysna, to ninepence for the Humansdorp district, for the reasons I have given above; if, therefore, these reasons hold good for stinkwood, why should they not do so for yellowwood?

'Honey hunting is still carried on with impunity, and I take this opportunity to draw your attention to the difficulty in prosecuting forest cases in this district. To begin with, the court is a two days' journey from the forests, and the guard or ranger would have to absent himself a week from his range at the least; this would not be a matter of so great importance during the off season, but during the season when felling is going on in the sections, it would be running a great risk to leave the bush-cutters to themselves for so long a period.

'The guards are so few and far between, that they are compelled to go alone on their beats; these are, therefore, generally the only witness of the offences. In France the guard's evidence is sufficient to convict, until proof of the contrary, when the penalty does not exceed £5; why should not this be the case here?

'Again, the majority of cases are of a trivial nature, breach of the forest regulations without ill intent, such as for instance removing their wood from the saw-pits without having it stamped, &c., a small fine would be amply sufficient in these cases, and would be enough to deter them from doing the same thing again; why should not forest officers have power to impose these small penalties?

'With your instructions I superintended the cutting and preparation of the wood samples for the London Inter-Colonial Exhibition; in this I was greatly assisted by the help of convict labour from the Road Department, Storms River Station, and was thus able to obtain a complete collection with the small funds at my disposal. Many of the samples were cut from trees in the clearings made by the Road Department in the construction of the road, the preference being given to these on account of their having had a longer time to season, the rest were cut in the forests from the finest trees obtainable. Of each species a sample 7 feet long by 4 inches thick was cut, also a half inch plank of the same length for veneers, &c., and a circular section 12 inches thick; the sample planks were bound at their ends with bands of tin and seasoned as quickly as was possible, and they will I hope meet with your satisfaction.'

Another, was a report by Mr Fourcade on the George and Western Knysna forests, which is explicit, important, and interesting, but embracing so much that portions of it may be summarised in presenting it to readers not personally interested in the details given.

Having stated that the forests under his charge had been divided for purposes of systematic treatment into 22 series, he gives the designations and areas of them—in all, 14,960 morgen—he specifies these thus:—'(1.) Comb, 584 morgen; (2.) Marias Bosch, 476; (3.) Quar, 453; (4.) Red Els, 933; (5.) Keur Kop, 585; (6.) Knysna River, 663; (7.) Portland, 773; (8.) Eiland, and (9.) Rattlebosch, about 2000; (10.) Homtini, 630; (11.) Kraaibosch, (12.) Elandskraal, (13.) Van der Watts, (14.) Karatera, about 2,500; (15.) Wolve Eiland, 715; (16.) Braak Kloof, 645; (17.) Beer Vlei, 675; (18.) Diep River, (19.) Woodville, 1,163; (20.) Olifant's Hoek, 762; (21.) Silver River, (22.) Kayman's River, 1,403; total area, 14,960 morgen;' and proceeds:—

'These forests form a belt narrow but almost unbroken, stretching from the Gowna River above Knysna to the Kayman's River near George; scattered over the mountains above there are also a number of patches, for the most part along inaccessible kloofs. Including these, and the small forests west of George Town, the Crown forests of which I am in charge cover an area of 16,000 morgen. The private forests in the same parts cover 3000 morgen, and the total wooded area, west of Gowna River, may be estimated at 19,000 morgen.

'The forests nearest George, forming the Kayman's River, Silver River, Olifant's Hoek, and Woodville series, have been overworked, and are now closed. They are exhausted, not because too much timber has been derived from them, but on account of the wasteful and careless manner in which they appear to have been worked. The closing of these forests was very urgent, for ten years more of the same treatment would have ruined them beyond hope of recovery. What they now need are "nettoiments" to get rid of the old crowns, dead wood, and creepers. A step in this direction has been the issuing of firewood licenses for dry wood only, provided that its

removal did not necessitate the opening of fresh *slid-paths*. But the work of thoroughly cleaning a forest is too expensive to be undertaken in a region where there is practically no demand for firewood and small timber; and on the score of expense the regeneration of the George forests has to be left to depend on the issue of a protracted struggle between the valuable and the useless growth. This will of course unduly lengthen the time necessary for their restoration.

'The demand for wood is not at present such as to necessitate the opening of sections in the Diep River, Van der Watts, Rattlebosch, and Comb series. The remaining unopened series, viz., the Marais Bosch, Homtini, Elands Kraal, Karatara, and Wolve Eiland series, would be best worked on the "jardinage" or selection system, but on the whole it is preferable to keep these forests closed as long as the demand does not exceed the supply of wood marked for felling in the open sections.

'In such a case a further supply of timber would be obtainable by judiciously marking the fully mature trees, which if left must decay before they can be marked in the ordinary course of "sectioning."

'The four series last named consist of the forest-clad slopes of the Homtini, Karatara, and Hooge Kraal Rivers, and form the subject of a dispute between the Government and the owners of the adjacent farms. The Government has caused a survey of the farms to be made by Mr Surveyor Ballot, and has made definite proposals to the landowners, and we may look to an early settlement of the land difficulty in this division.

'As soon as this desirable end is attained it will be expedient to cut demarcation lines, between the farms and the Crown forests, in order to prevent further disputes as to encroachments.

'Systematic treatment has been introduced into nine of the series—the Quar, Red Els, Keur Kop, Knysna River, Portland, Eiland, Kraaibosch, and Beer Vley series.

'Five sections have been laid out during the year; the quantity of timber marked and available for felling is:—

	Trees.	Cubic ft.	Value. £ s. d.
Section Keur Kop series ...	1,008 ...	18,710 ..	355 5 7

	Trees.	Cubic Feet.	£ s. d.
Section Knysna River.....	1,837 ...	43,489 ...	804 8 1
,, Portland.....	1,678 ...	35,843 ...	629 13 4
,, Eiland	1,133 ...	17,273 ...	240 8 4
,, Beer Vley.....	663 ...	8,494 ...	104 18 5

In proportions which are stated. And it is added:—'These sections are opened for two years, and half the above yield of timber may be derived from them in 1886.'

Of the timber left in the sections that have been worked one year open for 1886, there is reported the number of trees, the cubic feet, and the value; and, after some remarks the writer proceeds: —

'The new regulations have worked satisfactorily so far; the wood-cutters after felling in private forests begin to find out that it pays them better to work in the sections. One of their mistaken ideas was that timber valued standing was estimated too high, but though this might occur in the case of individual trees, when the difference, if above 10 %, is made good to the licensee, it is found that for larger quantities the sound wood obtained may be taken to exceed the departmental estimate by a reasonable margin. For instance, in the only two sections for which I have complete returns at hand, the estimated and verified contents of the trees felled during last felling season were respectively 11,451 and 12,443 cubic feet, the same allowance for squaring having been made in both measurements.

'The time for slipping had to be extended this year on all the licenses issued. Fourteen days is too short a time to remove all the timber that may be felled on a single license; and about three months had to be allowed in most cases.

'During the close season licenses have been issued for windfall timber. Windfalls are generally supposed to yield an inferior quality of timber, but the number of trees periodically blown down constitutes too valuable an asset to be overlooked, especially as it is an asset which if not realised would soon disappear. And I may add that through the sale of timber of this description, the inconvenience caused to the wood-cutters by the closing of the sections, is palliated to a certain extent.

'The special work done during the close season consisted chiefly of surveying and "sectioning."

'A detailed survey of the Gowna forest, begun in 1884, was resumed and extended during the year, the total areas surveyed being approx. 7,000 morgen, of which 4,100 are wooded. Plans of each of these forests were drawn to the scale of 100 roods to 1 inch, the topographical features, more particularly the forest perimeter, the rivers and the main paths being shewn with the accuracy that is needed in a working plan

'The main triangulation was reduced from the distance of two of Captain Bailey's trigonometrical stations, a measured base of verification ageeing to $\frac{1}{20000}$ with its calculated value; a minor triangulation then served to connect the topographical stations, and to fix the end of traverses of paths used as boundaries of series, &c. Traverses have often to be resorted to in forest work, but a tolerable accuracy is maintained by uniting both the ends with the triangulation, the error found being distributed by compensating the co-ordinates of each of the intermediate points.

'Several small surveys were also performed during the course of the year, including the re-survey of the altered boundaries of some series, and the laying out of the different forest sections. A forest lot was also demarcated to prevent encroachment from the neighbouring farm.

. . . . . .

'I would propose that a few allotments be surveyed at Sour Flats, none exceeding two morgen in extent, to be allotted to *bona-fide* wood-cutters only. In laying these out care should be taken that their situation cannot effect the working of the forests. Subsequent to such settlement, authority should be given to the officer of the Forest Department in charge to grant to wood-cutters working in the open sections leave to reside at Sour Flats for such a length of time as may be deemed necessary.

'Together with surveying, "sectioning" formed the more important part of the work done during the close season. Four sections were laid out during the year in the Keur Kop, Knysna River, Portland, and Eiland series. The number of trees marked for felling, their estimated contents, and their value, have been given above. Instruction No. 2 of the summary were followed throughout the operations.

'During the year a quantity of charcoal required by the Railway Department was manufactured at Gowna under my supervision. When tested in the Salt River workshops it proved to be of excellent quality, and declared far superior to the imported article. The experiment has shown that charcoal-burning may become a profitable industry. No doubt there are many others in a similar latent state, which lie undeveloped for the want of capital or enterprise. In India the revenue derived from secondary forest products, such as gums, resins, barks, &c., forms a considerable share of the general revenue, while here there is no provision for the sale of forest produce of this description.

'The barks of some of our forest species, notably those of saffraan, assegai, kershout, stinkwood, and n'tekara, are valuable for tanning purposes; their value depends on their richness in tannin, which should be determined. In a South Australian report for 1884 Dr Schomburgk says that an industry which seems to promise well in South Australia is the production of sumac, which consists of the powdered leaves and twigs of *Rhus Coriara*, and *R. cotinus*, shrubs of the Mediterranean region, and grown largely in Southern Europe for the sake of the leaves. Sumac is mostly used for dyeing greys and blacks. We have in South Africa nearly 60 species of the same genus, and some of the commonest, notably the various sorts of Taaibosch, might prove equally valuable.

'The value of Kamassi as a substitute for boxwood has only lately been recognised, and it is probable that among our woods there are many others that might also be utilised for special purposes.

'The determination of the uses each wood may be put to involves that of their "mechanical properties." This has not yet been done, but it should be done at a small outlay, and I would strongly urge the desirableness of the work.

'I was instructed to prepare a forest herbarium for transmission to the Indian and Colonial Exhibition. Owing to the short notice at which the collection was formed, specimens of many of the species could not be obtained in time, but an additional few have been procured since, and before long all

the more important species will be represented in the Forest Department herbarium. I append a list of the determinations which I have made, marking with an asterisk those species of which I have seen no flowering specimens.'

The list comprises 75 species.

Section II.—Forests in British Kaffraria.

Similar in importance to the forests of the Knysna are the forests in British Kaffraria. In regard to these, Mr D. E. Hutchins, the Conservator, reported in 1883:—

'The general commercial depression has, of course, affected the timber trade, and both officers have to report a falling revenue. The same fact is noticeable in the revenue from the larger King William's Town and Stutterheim forests. I apprehend that the Stockenstrom timber rates will be unified with those prevailing in the Amatola country as soon as the demarcation now in progress (separating the Government forest from the erf-holders' commonage) is completed. It is painful to notice that 14,160 cubic feet of timber have been removed from those exhausted and fire-swept forests for the small equivalent of £153. In the overworked state of the Stockenstrom forests every tree is precious, and we have to thank the general stagnation of trade for the fact that a larger quantity of yellowwood has not been sold at the almost nominal rate of £1 per 100 cubic feet, or 2·4d per cubic foot. Mr. Atmore estimates "the extent of forest destroyed by fire this year at over 1,000 acres" in the Stockenstrom division.

'The number of cubic feet of wood cut in the King William's Town and Stutterheim divisions during the year cannot be ascertained, as timber has been sold at so much per log, and it has not been customary to measure the timber either standing (in the forest) or worked, before delivery. Fivepence and sevenpence per cubic foot are the present rates for timber. Having in view the necessity of conservation and works of improvement to restore the forests, I am of opinion that the unified rate for selection felling in the eastern forests should be;—

6d.	per cubic foot	for	Outeniqua	Yellowwood.	
8d.	do.	do.	Upright	do.	and other woods.
1s.	do.	do.	Sneezewood.		

Sneezewood poles to be sold by stacked measurement, and in all irregularly worked and unsurveyed forests, only dry sneezewood to be cut. In surveyed and regularly worked forests, the wood will be sold by compartments or sub-compartments, for what it will fetch. There is but an insignificant area in the Stockenstrom forests which can bear any further felling, without endangering either the natural reproduction or the fire protection of the forest. And as soon as the demarcation of those forests is finished, it will be desirable to close the Government reserves entirely, so that the chief ranger may devote his whole time to fire protection, surveying, and the preparation of data for regular management schemes (Aménagements.) In the Amatola forests under my direct charge, it is proposed to issue no licenses for green sneezewood in any unsurveyed forest, worked irregularly, by selection felling (jardinage.)'

There follows an account of tours of inspection made by him on entering upon the charge of the forests, with statements of the area, and suggested divisions of the forests inspected between King William's Town and the coast, measuring in all 18 square miles; and notices of other forests visited; and of the proper season for felling. He advocates immunity from all felling of trees situated near watercourses, roads, and the edge of the forest, and reports:—

'No licenses have been issued, and it is proposed to issue none in the future, for the felling of trees situated within 20 yards of any watercourse, of any road, or of the edge of a forest. In the case of trees so placed, the benefit accruing from their position far outweighs the loss involved in deferring their exploitation till the period of their physical maturity, that is to say, till they perish or fall from natural causes. A plain rule of this description is easily remembered, and I hope may be enforced by the police, where there are no forest officials. The utility of some such rule scarcely needs comment. Small streams exposed to the sun and the powerful drying winds of

this climate, can be observed to dwindle and disappear shortly after they leave the shelter of the fringe of trees which usually overshadows and marks their course near the forests where they rise. The conservation of streams of water has been laid down as one of the main objects of forestry in the Cape Colony.

'The preservation of trees near roads is usually considered essential; it is a measure of obvious utility and comfort to travellers.

'And lastly, with regard to trees on the edge of a forest. It is characteristic of an evergreen forest that the line of separation between the forest and the grass land is sharp and well defined; near the edge of the forest is usually a sturdy dense growth which forms a natural barrier against the fires of the grass lands. If a large tree is felled on the edge of a forest, this natural boundary is broken. The place of the felled tree is usually taken at first by a rank growth of grass and herbage, which subsequently becomes inflammable, and which, joined to the dead crown of the tree, forms a pile of combustible matter in a place which is certain to catch fire when the surrounding grass land is next burnt.

'Thus the gap left in felling a tree on the margin of a forest burns, and will probably burn again, on each occasion eating away the forest on both sides, till a regular boundary between the grass land and the forest has been re-established at the expense of the forest. If the forest has been over-worked, the covert broken, and the ground invaded by grass and rank herbage, a fire started at the margin will possibly run through the entire block of forest.

'Another reason why it is desirable to preserve the natural boundary of the forest intact is on account of wind, a most important factor in regulating forest distribution, especially in mountainous countries.'

There are given the terms of a notice issued by him; the subject of seasoning timber is discussed; and the report proceeds —

'*Grazing.*—As soon as a forest is demarcated the question arises within what limits, if at all, should grazing be permitted.

Only in a forest in which reproduction is left to take care of itself, can grazing be permitted without restriction. But I have known cases in which the absolute exclusion of cattle has been carried too far, in which the cattle did less harm to forest reproduction than the grass which succeeded the cattle, not to mention the increased danger from fire, the increased cost of fire protection, and the loss in money value of the grazing.

'In the forest reserves which have already been demarcated in the Amatolas it is proposed to fence a portion of the demarcation line where this passes near native settlements, or across roads and runs ordinarily frequented by cattle. Kaffirs herd their cattle, and, with this assistance in the way of fencing, they can easily keep their cattle from portions of the forests which are under reproduction, and indicated as being closed to grazing. To prevent wilful trespass, a certain number of pounds will be necessary. The portions of the Amatola forests which must be closed against cattle are:—

'1st. That along the lower slopes of the mountains, immediately within the demarcation line. It is there that the forest has been deteriorated by irregular and excessive fellings, or destroyed by fire and axe, for purposes of unauthorised cultivation.

'2nd. Plantings or sowings in glades, intervening strips of grass land, old mealie cultivation, and, generally, all areas in which artificial reproduction is being attempted.

'3rd. Areas being treated for natural reproduction, such as a seedling coupe (*coupe d'ensemencement*), a secondary, or a final coupe.

'From other portions of these forests the advantages accruing from the complete excluding of cattle are, to some extent, outweighed by the disadvantages, but it would appear to be advisable to enforce the absolute rights of Government in the reserved forests, so far as to demand a small annual fee for each head of cattle grazed within the demarcation line. This and the pound fees would form a fund probably sufficient for the maintenance and patrolling of the demarcation line.

'As regards forest, pound, and grazing fees, no distinction need be drawn between cattle, sheep, and horses. Pigs are

beneficial in a forest, and should be admitted without restriction. For goats the ordinary pound fees should be doubled, and no licenses issued for goat grazing in any portion of the forest.

'The regulation of cattle grazing must be left to the judgment of the local forest officer; no hard and fast rule can be laid down. But, as regards goats, there should not be a momentary hesitation in ordering their absolute and unconditional exclusion from a reserved forest. Forest literature teems with examples of the forest destruction wrought by goats in warm and temperate countries, where goats abound. Forest growth is the natural food of a goat, as grass is that of horses or cattle. In a forest overrun with goats natural reproduction must necessarily cease.

'*Game.*—Deer do considerable damage in the upper portions of the Amatola forests, and in the denser portions of the Buffalo River forests between King William's Town and the coast. As was remarked by Captain Ricketts, when we were examining the latter forests together, deer seem to have an especial fondness for browsing on young sneezewood saplings. This is the more unfortunate, as sneezewood re-growth is the important and pleasing feature of these forests. It is an evil which can only be combated in detail, and with the help of regular working, compartment by compartment. When the forest is arranged in groups of age-classes, measures can be taken for protecting by fencing, or otherwise, the seedlings in any two or three compartments that require it.

'*Licenses.*—The felling of individual trees on license will gradually become less as the regular working of the forests comes into force, But, in the meantime, the following improvements appear to be suggested.'

These are specified, and he proceeds :—

'Further experience will, necessarily, introduce modifications. But the inherent defect of every license system, which it is difficult even to palliate, is, that is the purchaser who selects the trees for felling. Restrictions may be imposed; the borders of streams and the edge of the forest, for instance, may be declared inviolable, but it is essentially a vicious system which

leaves the purchaser to select his own trees, regardless, of course, of their environment, and the future of the forest.

'The advantage can hardly be over-estimated of having regular coupes, in which every tree is inspected and adjudged, reserved, or fit for felling (once in a period of years), by the forest officer in charge. A purchaser of even a few trees on license may materially injure the forest by cutting what should be left standing. To take a case in point: there is a gap in the forest, caused perhaps by wind or fire, and the wind or fire may have left a few well formed trees standing apart, and perhaps approaching a natural seedling coupe. A bush-worker finds this a convenient place to make a pit, takes out a license, and fells exactly the trees which, looking to the future of the forest, should be left for reproduction. The above is an illustration, and perhaps an extreme case, but, if a system has only a bad tendency, it must, over a period of years, and in various hands, do considerable damage in the aggregate.

'With fellings scattered throughout a division, it is, of course, impracticable for the forest officer in charge to inspect each tree for which he grants a license. All that it appears possible to enforce at present is, that before a license is granted, the tree may be seen, and the girth and length of bole taken, by one of the Kaffir wardens, who can be held responsible to the extent that the tree he measures is *not a margin tree* (*i.e.*, at the edge of the forest, or fringing a watercourse), or *palpably immature.*'

There follow important remarks on matters to be observed in the selection of sneezewood trees to be felled, the wood being valuable. And the report proceeds:—

'*Firewood.*—The only condition endorsed on firewood licenses is that no seedling or sapling of a timber tree is to be felled for firewood. Even this, with the present forest staff, it is impossible to thoroughly enforce. Firewood cutting has the same ugly feature about it that has pole cutting (in a high timber forest), namely, that, if unsupervised, it endangers the future of the forest. As a temporary measure, pending orders on proposals submitted for employing competent foresters, one

of the forest wardens has been stationed at King William's Town, to which place the greater portion of the firewood cut is taken. Little can be done towards controlling the firewood cutting for the King William's Town market, till foresters are put in charge of the Perie and Mount Coke forests. When the Perie and Mount Coke forests are demarcated it is proposed to lay off a portion of them for treatment as coppice. Coppice (taillis) is usually considered an inferior class of forest to high timber (futaie.) In France considerable areas of forest have been converted from coppice to high timber, and the process is still going on there. But coppice has distinct advantages, especially where there is a large demand for small firewood. Briefly, coppice yields usually less wood per acre than high timber, but a higher rate of money interest on its funded value. At Mount Coke and Perie, within a few miles of King William's Town, some good fuel copses would be a great convenience to the inhabitants of the town, but considerable care will be required in establishing the copses. For instance, non-coppicing species will disappear at the first or second cutting, and to fill up the gaps so created, it will be necessary to resort to artificial reproduction. Nettoiements will be necessary to get rid of the thorns and useless growth, which invariably follow clean cutting in these forests. I should endeavour to introduce the oak. Oak copse would yield both fuel to the town and bark for the tanneries. Wattles would be better for tanning, but yield inferior firewood, though they would probably grow considerably faster than the oak, and cover the ground at less expense. In certain cases it will be advisable to issue free firewood licenses for the removal of thorns, creepers, and low brushwood, inimical to the growth of seedlings and coppice shoots. Fortunately, coppice shoots are more vigorous, and require less nettoiements than seedlings. Nettoiements will probably be found to possess the peculiarity that, if taken in time, they can be easily performed, but, if postponed, they will be difficult and expensive. If neglected, the chances are all in favour of the forest becoming converted into a thorny scrub, as has indeed happened in localities too numerous to mention in the eastern forests, from the highest

woodlands, approaching 5000 feet elevation, at the upper Tyumie, to near the sea level, in the valleys of the Buffalo and Nahoon Rivers.

'Five shillings a load is a small license fee to pay for a full sized (20 feet in length) waggon-load of firewood, though this is the rate in force at Knysna and throughout the greater part of the Colony, even in the eastern forests, where the rates for timber are properly higher than those at Knysna. The price of firewood licenses was fixed when money was scarcer, and such raw materials as wood and grass had less value than now. The price bears hardly the smallest proportion to the money value of the damage which may be done to an irregularly worked forest by the removal of a waggon-load of unsupervised fellings. It seems desirable that the point should be considered, whether, now that the conservation of the forest is being put in practice, the price of firewood should not, like everything else, advance in proportion to the necessarily increased cost of production. I should suggest that the license fee for a waggon load of firewood be raised to seven shillings a load. The small handy waggon of the German pays relatively less than the common large waggon, but these smaller waggons and teams of oxen do less damage in the forest than the larger, and ought to be encouraged. The damage done to some of the forests by firewood cutting has been lamentable. The forests of the East London division are rich in sneezewood, but very deficient in timber of any size. Yet it has been common enough there for sound timber trees, of three and sometimes four feet diameter, to be felled for firewood, the crown utilised for firewood, and the trunk left to rot on the ground. Elsewhere, clean cutting has been practised, and all that it did not pay to remove as fuel, burnt in the forest. The ranger's representations on this subject seem scarcely to have met with the attention which they deserved. I have addressed the Civil Commissioner, and understand that remedial steps have been taken in the matter. It must not be supposed from the above that there is any objection to clean felling per se. Systematically performed, with due reservation of standards, together with subsequent nettoiements, and measures to fill up

the gaps left by the disappearance of non-coppicing species, clean felling would represent the treatment required to produce a regular coppice-under-standard forest. But the practise has been in East London to allow the bush-workers, who are there all natives, to cut and burn without restriction, and the result is the disappearance of the forest, or its conversion into a thorny, creeper-infested scrub.

'*Forest Destruction by Natives.*—If the principle be followed, that the payment on licenses for cutting should bear some relation to the cost of the damage which may be done to the forest, or to the cost of the supervision to prevent that damage while the licenses for firewood might be raised from five to seven shillings, it is, without doubt, necessary that the cost of licenses for wattles for huts and kraals should be raised. These now pay seven shillings and sixpence per hut, and fifteen shillings per kraal, and I submit that ten shillings per hut, and one pound per kraal, is the lowest sum that should be taken in future for cutting on a license, which is usually followed by such destructive effects. The native living near a forest looks upon it as his property, to be cut about as he likes. If he wants a bees' nest, or a particular branch for his hut, down comes the tree. I have seen valuable young saplings felled for their fruit. It is this steady pitiless destruction which does so much to deteriorate the forest. The following words occur at the conclusion of Mr Melvill's (Assistant Surveyor-General) report on land matters in the King William's Town division:—

'"The natives, but more especially the Fingoes, seem to possess quite a mania for destroying everything in the shape of trees or bush. Wherever they come to live, these totally disappear within a year or two, and the country assumes a desolate appearance compared to its previous aspect. This is exemplified in the Chumie Valley, once thickly covered with bush, on the banks of the river, and on the slopes on both sides of it, but now on the side inhabited by natives, completely cleared of every vestige of it, while, on the opposite side, which is in the possession of Europeans, it is still covered, or prettily dotted, with its native trees and bush, in addition to those artificially grown. I submit that it is a matter not unworthy the considera-

tion of the Government, whether, in regard to land alloted for the occupation of natives, by grant or otherwise, stringent measures should not be adopted for deterring them from committing such barbarous, and, and at the time, highly-injurious devastation."

'It appears right that natives, who live near forests, should either build their huts and kraals of stone, sods, and small brushwood (as do the great majority of natives), or that they should pay something for the extra supervision entailed by their presence in the forest with axes. One of the main objects with which forest demarcation is now being carried on in the Amatolas, is to give the forest a clear, definite, and regular boundary, across which if a man is found with an unlicensed axe, there will be as plain a presumption of theft as in the case of a poacher carrying guns and snares, or a stranger in a house with false keys in his possession.

'*Forest Demarcation and Survey.*—Forest demarcation appears to be as necessary here as it is in India, where it has been the chief work of the Forest Department for many years. As a country becomes settled, landed property must either have its boundaries defined, or submit to continual encroachments. The state of the Amatola forests is so graphically sketched by Mr. Melville, that I must be pardoned for again extracting a few lines from his report:—

'"In connection with land matters in these parts, I wish to draw the attention of the Honourable the Commissioner to the fact that a considerable, though gradual, destruction of the forests in the valleys and on the spurs of the Amatola range is going on. There is a constant encroachment on them by the natives living in their neighbourhood, with their gardens. Everywhere I saw traces of this, in the shape of land, formerly forest, completely denuded of trees, or partially, with only here and there a tree, or a stump of one, with a charred trunk left standing, fire being employed for killing them previous to their being uprooted. I noticed considerable extents, which I knew years ago to be covered with magnificent forest trees, now turned into bare hillsides, with gardens dotted over them. I believe, too, that much valuable timber is cut surreptitiously,

and I have grave doubts whether the employment of native rangers . . . is calculated to materially prevent this denudation, and the consequent injurious effect inevitably thereby produced on the rainfall of the country, and on the volume of the water of the springs and streams having their origin in the Amatola ranges."

'Instances appear to have occurred where natives, who have been placed on surveyed land, have abandoned the land assigned to them for cultivation on account of the trouble of manuring it, and have destroyed forests wantonly, and cultivated forest land illegally, simply on account of the superior richness of a forest soil. Mr. Budge's farm near the Perie was formerly bounded on one side by the forest. Native cultivation has gradually crept in between his farm and the forest, and now mealie fields lie between his farm and the forest. In nearly every valley of the Amatolas, the lowest, and very often that portion of the forest which carries the best timber, is eaten into and honeycombed by mealie gardens. In some instances title-deeds have been granted for these gardens, for until a boundary to the forest has been laid out, it is impossible for Goverment to judge how the grant of a petty land application may be injurious or not to the forest. Economically, forests should rarely occupy land which can be cultivated, but, evidently, a large tract of mountain forest should not be sacrificed for a few level patches of cultivable land in its midst. When even only a few small pieces of land are alienated in the midst of a large tract of forest, the management of the forest becomes at once more difficult and expensive. Rights of way must be granted in every direction, and the prevention of cattle grazing, of fires, or of illicit fellings, becomes well nigh impossible. The detection of illicit felling is naturally rendered more difficult by the presence of private wood owners, whether situated inside or on the outskirts of a large tract of forest. In the case of a small native bush owner, the temptation to pilfer from Government forest, and sell the produce as coming from his own bush, is almost irresistible; the possession, or sale of forest produce, unstamped and without license, in his case, being no presumption of guilt.

'Forest demarcation in the Amatolas was begun in the Inyàmèni valley lying at the foot of Amatola peak. From there the line, sweeping round the scattered forests lying at the skirts of Kata peak (4,500 feet), bends to the south, taking in all the forest lying at the head-waters of the Kata, Nqolo-Nqolo, Keiskama, and Umtwaku streams, as well as the Dontsa forest, which is now being surveyed. Up to the 31st December the line had been carried as far as Kabousie neck. Five sheets of tracings have been submitted to the Superintendent of Woods and Forests, the original plans being in the Conservator of Forests' office, King William's Town. Sheet No. II. is appended to this report as a specimen. From the 18th September last, when the work was begun, to the 31st December, 19·99 miles of demarcation line have been laid out on the ground and surveyed. Of the adjoining forest all the larger blocks have been surveyed; the smaller pieces of forest, which it would be waste of time to survey, have been sketched in to scale. The total area of dense evergreen forest dealt with is 4·73 square miles, or 1422·55 morgen. It is hoped that at the present rate of progress, all the more important forests of the Amatola country will have been demarcated and plane-tabled by the close of 1885.'

There follow valuable and important suggestions in regard to settlement of rights of servitude, &c., restrictions on fellings in impoverished forests, the management of demarcated forests, and fencing; and Mr Hutchins, the Conservator, proceeds to report on the schemes of management which had been prepared:—

'The forest plans now being prepared, intended to serve as working-plans, are on a scale of eight inches to the mile. In view of the broken character of the forest, and the quantity of small, scattered, sowing and planting, which has to be executed, in order to form the forest into one continuous whole, this is as small a scale as it would be safe to adopt. This scale has been chosen on a consideration of the character of the forests, and of the future work which most of them will require. In the first place, no fire-protection on a large scale

will be necessary, such as has to be carried out in India, over immense areas of poor open forest; for work of this description a scale of four inches to the mile is quite sufficient. But, on the other hand, much planting and artificial regeneration will be necessary. For plantations a scale of eight inches to the mile is the smallest that is of any practical use. I extract the following from a recent report (by Dr Brandis, then Inspector-General of Forests, India), which was circulated for the information of forest officers in the Colony.

'"Plantations and forests which require intensive working, demand maps on a large scale. Thus, it will be seen on reference to paragraph 299 of my report on the North-Western Provinces and Oudh, of the 1st November, 1881, that for one block of the hill forest mentioned above, which had been surveyed on a scale of four inches to the mile, it has since become necessary to prepare a map on the scale of sixteen inches to the mile. And eventually portions of the reserves in Ajmere and Merwara will doubtless require maps on a larger scale than one inch to the mile. In cases when the boundaries of forest have not been demarcated, the scale must ordinarily be that selected for the tracts of country in which the forests are included."

'The scale adopted in India by the branch of the forest department, which is specially charged with surveys, is four inches to the mile. In a recent work by L. Macgregor on the Continental system of forestry, the scale adopted by the Indian forest department is criticised as being too small, and a scale of eight inches to the mile is advocated. The common scale on which farms have been plotted in old Kaffrarian maps appears to be eight inches to the mile.

'The technical details of forest management-schemes would be out of place in a general report, and a visit from the Superintendent of Woods and Forests is expected, which will afford an opportunity of discussing and settling on the ground the management schemes of the Amatola forests.'

There follow remarks on the introduction of exotic woods, and on the importance of the conservation of wood by sylvicultural operations.

In the report for the following year, 1884, it is stated:—

'The Crown forests in the east of the Colony are classified naturally into *mountain forests* and *coast forests;* the mountain forest being situated in the divisions of King William's Town, Stutterheim, Stockenstrom, and Victoria (East); the coast forests in the divisions of East London, Bathurst, and Alexandria.

'*Mountain Forest—Amatola forests, now being put in order for systematic working.*—With the exception of the fine forest on the Amatola mountains and subsidiary ranges, the mountain forest in the east of the Colony has been either alienated, or rights of so destructive a nature have been granted, that the forest was rapidly disappearing. The Amatola forests, as a whole, still remain national property, an estate of which any country might be proud! Situated as these forests are, their destruction, followed by the detorioration of the climate and water supply, would threaten the ruin of the surrounding country, and forest destruction there, would probably be the determining element whether the country should progress and support its own increasing population, or relapse into the decayed condition of Bathurst and other earlier settled parts of the Colony. Grave and deplorable mistakes have occurred in the management of the Amatola forests in the past, as for instance when a large slice was nominally sold out of the centre of the Perie forest for *a small fraction of the value of the timber on it*, or when 50,000 immature young sneezewood saplings, worth many pounds each to the Stutterheim forests, were cut to make worthless sapwood telegraph poles. In the more accessible parts of the forests the best timber has been stolen, or sold for a trifle on time licenses. Happily a large portion of the forests was inaccessible without made roads, and this has been a great source of protection. Until the survey and final settlement of these forests, now in progress, is completed, it is difficult to say how far the mistakes of the past will affect the systematic working of the forests in the future. Much will depend on the manner in which their survey proceeds, and how the questions involved in their settlement are treated. A little firmness, a little liberality now, in dealing with those, who, though they may have originally usurped forest rights, have

enjoyed them for many years, will put the Amatola forests on a sound basis of management.

'How a fine forest estate may be frittered away, and, as a whole, lost to the country, there is the sad history of the Katberg forest to tell. Plundered at first by wood-stealers, overworked and unsystematically worked by Government, for the sake of a few hundred pounds above the cost of management, thrice swept by fire; a few blackened and charred limb standing in a tangle of thorns, now show where the forest once stood, a forest then the pride of the Province, and about which people who have not visited the locality for some years still speak with admiration. Localities such as these show little sign of natural reproduction, and left to themselves, are burnt over every second or third winter. Evergreen forest, if rationally managed, has nothing to fear from fire; but I have noticed, both here and in India, that if once destroyed its re-establishment is more difficult than is the case with deciduous forest, the species of which have fought out a struggle for existence in which fire plays the part of chief factor. The Katberg forest is said to have been originally superior to the finest virgin forest now existing on the Amatolas. What remains of the Katberg forests has been demarcated during the year.

'In the Amatola forests steady progress has been made on the lines indicated in last year's report. The Dountsah, Isidenge, and Perie forests, have been surveyed and demarcated, the system followed being that which is in force in India. As the result of instructions from the Surveyor-General, *a good forest demarcation*, and a partial plan of the forest on the Hogsback, has been obtained from the Government Surveyor, employed in laying out agricultural allotments. This plan will now be completed by the Forest Department and adopted as the working plan of the forest.

'The coast forests have come into notice during the year, by the discovery that the so-called Cape box is of value for engraving and other purposes for which real boxwood is used. The area of box-producing forest in the Buffalo River valley is estimated at fifteen square miles. Box also occurs in the valley

of the Keiskama River, near the coast, but has not as yet been detected west of this in the valleys of the Fish River, Kowie River, and Bushman's River. A few real box trees (*Buxus sempervirens*) have been planted out in the forests in the King William's Town, Stutterheim, and East London divisions, and supplies of box seed for stocking the nurseries are expected from Paris and India. That from India, the produce of the Himalayan box, will probably prove of the greater value.

'In all the divisions there has been a falling off in the revenue derivable from timber. This is accounted for—1st, owing to there having been very little demand for building timber, and absolutely no demand for waggonwood owing to the almost total suspension of waggon-making; 2nd, to the conservation of the forest.

'Pending the survey and systematic working of the forest, it is naturally advisable to reduce irregular fellings to a minimum. But, in addition to this, there was a considerable quantity of timber lying felled in the forest. This naturally had to be disposed of first, as it was rapidly decaying; and the sale of this had been sufficient to satisfy the small demand for timber during the year. This waste and decaying timber was sold at half-price. It is mostly derived from logs felled for sleepers two years ago in the Isidenge forest. But refuse timber still remains in all the forests, as the habit had been to sell timber, without measuring it, at a fixed sum per log. The purchaser chose the tree to be felled, and thus the best timber has been picked out of the accessible parts of the forests. A purchaser would naturally take the good timber and leave the inferior, but the unfortunate part of the old system was—that he was precluded from buying inferior logs, since he had to pay a fixed arbitrary price, as much for a good log as for a bad one. The forests are at present in a transition state, between the time when nothing was spent on them, and everything taken out of them, and the time when the present restorative measures shall have come into full force. And during the transition period while the whole timber is being cleared off at low rates, and nothing spent on replacement, supervision, and the introduction of [illegible] working, the revenue must

necessarily be less than it has been. Considering the severe trade depression prevailing in 1884, and the fact that only refuse timber has been sold, I must own to being satisfied that the falling off in the revenue from timber is not greater than from £640 in 1883 to £307 in 1884; and it is a healthy and satisfactory feature that the revenue from firewood has risen from £191 in 1883 to £386 in 1884. As a matter of fact, less firewood has been cut this year than last, owing to the closing at King William's Town of some mills and other workshops using steam-power. But the increased revenue is due to the measures taken for ensuring that all the firewood taken from the forest is paid for. The revenue from firewood in East London shows a small decrease, owing mainly to the stoppage of the practice of cutting boxwood for firewood, and a similar result was produced in Bathurst, when the cutting of sneezewood for firewood in Government forests was stopped. Both in Bathurst and East London divisions there is such a large area of private forests, and when conservancy restrictions are introduced into the Government forest, purchasers go to private owners to supply themselves. With these general remarks I shall proceed to describe forest work in each division, beginning with the Amatola forests in the King William's Town and Stutterheim divisions, of which I have direct charge, and passing on to the forests in the remaining divisions which are in charge of local rangers under my supervision.

'*Survey, Demarcation, and Settlement of the Amatola Forests.*—This has been the principal work on which my assistant and myself have been engaged throughout the year. It need hardly be remarked that before the systematic working of a forest can be introduced, the forest must have been surveyed. It must have clearly defined boundaries; and all forest rights and usages either extinguished, commuted, or clearly defined.

'On the topographical map of the Colony, a blank white spot shows roughly the position of the forest-clad Perie range of mountains; and along the main chain of the Amatolas some black, sketchy, and not very correct topography, occupies the place of the most important natural feature of the country, the

forests. This deficiency is now in process of being supplied. The system of survey adopted is:—

'1. A main system of triangulation with, as base line, Captain Bailey's recorded distance from his Hogsback Station to his Dohne Peak Station.

'2. A smaller triangulation furnishing points about a mile apart (or nearer where chaining is difficult), along the forest boundary and within the forest where points are required.

'3. Plane-tabling from point to point to fill up topographical and forest details.'

There is given a narrative of the operations, and the report proceeds:—

'It is difficult to express in figures the exact area surveyed during the year, because the large perimeter now being surveyed is not yet completed. The Mount Kemp Forest Reserve when finished will include the Perie, the Isidenge, the Izeleni, the Rabulla, the Gwili-gwili, and other smaller blocks of forest, in fact all the Government forests on the Perie range. It is proposed to name this the Mount Kemp Forest Reserve, Mount Kemp (4,250 feet) being the highest point of the Perie range. When completed the Mount Kemp Forest Reserve will form a tolerably compact mass of forest, about 50 square miles in area. Looking from Mount Kemp as a centre it will present the form of two arms—the longer arm the Perie range, lying east and west of Mount Kemp, the shorter arm running north to the main chain of the Amatolas. The following statement, as far as the unfinished condition of the perimeter will allow, exhibits the surveying and demarcation done during the year:—

Length of demarcation line laid out on the ground, beaconed and surveyed, ...	27·91 miles.
Curvilinear forest boundary surveyed, ...	109·87 ,,
Area of detached blocks of forest with closed perimeters surveyed, ...	5·22 sq. miles.

'As was mentioned in last year's report, the demarcation line is marked on the ground by beacons, built up of stones or turf, whichever is most readily available. A large stone on the top of each beacon carries the letters F.D. and the number of the

beacon, also a broad arrow, pointing along the direction of the demarcation line. These beacons are placed so that they can be easily seen, one from the other, sometimes only a few yards apart, and never further than a maximum distance of 10 chains, or 220 yards. Comparing these forest surveys with similar work done by Government surveyors, there is this difference—that while the latter may be more accurate, and is undoubtedly more expensive, the former, combining demarcation, survey, and settlement, is what is practically required for the systematic working and conservancy of the forests. To give an instance. An accurate paper survey was made of the Perie Mission forest. The practical result was many years of licensed plunder, which the missionary in charge, and the magistrate at King William's Town, were equally powerless to arrest, *since the forest boundary existed only on paper.*

'Towards the close of the year a draft notification was submitted, proclaiming the forest boundaries as demarcated, but allowing two months time during which objections could be lodged with the Civil Commissioner, pending the boundaries being proclaimed final. In demarcating the forest the rule observed has been to satisfy the neighbouring proprietors to the utmost extent compatible with a good boundary for the forest. In the case of surveyed land the diagrams are obtained from the Land Office in King William's Town, or from the Surveyor-General, the boundaries determined, and the demarcation line taken outside them. Small native holdings of a few acres in extent, situated on the borders of and within the forest, very much increase the difficulty of laying out a good demarcation line.

'*Re-organisation of forest establishment.*—Early in the year the re-organisation of the forest establishment sketched in last year's report, was carried into effect. A nominal saving of one shilling and sixpence per mensem was effected, and the native wardens and one European ranger (who lived at a farm at some distance from the forest), were replaced by six European foresters and four native forest guards.'

Details are given of sylvicultural operations, of observations on the growth of trees of different species, of arrangements

made with native cultivators of ground to bring it into proper condition for sylviculture; and the report proceeds:—

'Four of the foresters are paid at the rate of £5 per mensem, two at £4 per mensem, and the native guards at £2 per mensem. The depressed state of the times permitted of an unusually favourable selection of men to fill these posts, and a good beginning has been made with serious forest work. The foresters, stationed at first in temporary huts in the forest, were occupied for some months building themselves cottages. Wood and grass were naturally supplied from the forest: ready made doors and windows, a little roofing iron, and tools, were sent out from King William's Town. Each forester was allowed one man as an assistant for three months. The total cost of the five cottages completed has been £223 18s 9d.

'The Quacu forester, appointed after the others, has had to postpone making his cottage for want of funds to buy the doors and windows, &c.

'As has been mentioned, each forester is stationed in the forest of which he has charge. He has the use of a cottage and five acres of irrigable land round his cottage to grow garden crops for his own use, adjoining his cottage are two acres or more of irrigable land devoted to a forest nursery. Each forester is expected to raise 40,000 young trees during the year, these trees to be partly exotic, and partly the more valuable of the indigenous species, growing in the forest which he has charge.'

Details are then given of the work in demarcation which had been done—the difficulties encountered, the area completed; and of changes which had been made in a re-organisation of the forest staff.

There are also given, in regard to 40 prosecutions for forest trespasses and thefts in the forest, the name of the accused the charge, and the decision of the court; and the statement is followed by the remark:—

'The want of a forest law more suitable to present circumstances of the Colony than the antiquated Acts 17 and 18 of 1859 has been constantly felt. The Forest and Herbage Act, short and incomplete though it was, was perhaps suited to a

time when the belief was held that a forest would grow and reproduce itself, like grass after a shower of rain; when no heed was given to systematic forestry, and when it was thought sufficient to protect certain kinds of trees, and to prevent incendiarism. But at the present day such an exactment is worse than useless. It becomes a stumbling block in the hands of a weak or inexperienced magistrate; since it deals with certain forest offences, and omits others equally harmful. Thus, setting fire to the forest is a punishable offence; goat-grazing, which is more likely to damage evergreen forest than fire, is not punishable. It may be replied that goats can be impounded, but the pound dues for goats are only one-sixth of those for cattle, and goats are infinitely more harmful. Horses are charged higher pound fees than cattle, while in a forest they do little or no harm. And pigs, which are beneficial in a forest, are charged six times the pound dues of goats. Therefore, goat-grazing, as specially harmful to forests, requires special penalties in any Forest Act claiming to be complete. In many countries goats have played a more important part in the destruction of forests than any other agency. Again, cutting saplings of certain kinds of timber trees is a punishable offence, but the most valuable kind of timber trees escape the Forest and Herbage Act. To obtain a conviction under this Act for cutting timber saplings, it is necessary to prove that the sapling cut was of a kind of wood *ordinarily used for waggon-making, furniture, or building in the year* 1859. Sneezewood is an excellent waggon-wood, but too scarce to be used for this purpose in the Colony. Sneezewood is not ordinarily used for furniture, or house-building. And thus sneezewood, the most important species in the Eastern forests, can be cut with impunity, as far as the Forest and Herbage Act is concerned. Again, firewood stealing is not punishable under the Act. Indeed, this unfortunate old Act actually pats the firewood stealer on the back, by the definition of the term "tree," in Section viii. It is scarcely necessary to remark that if everyone may go into a forest, and cut firewood and brushwood, when and where they like, there is an end at once to all forest manage-

ment! Give a man a right to cut mature timber, and his right can be regulated so as to do the forest no harm; but give a man the right to cut brushwood and small wood—the forest re-growth—and he obtains the forest outright! Within the last few weeks it has been decided that offences such as firewood stealing, which cannot be reached by the old "Forest and Herbage Act," may be dealt with under common law. But this arrangement cannot be looked upon other than as a makeshift, reversing as it does the legal maxim, that special enactments override common law. Again, under common law, punishment is awarded according to the value of the property stolen, which no more meets the circumstances of forest cases than if poaching or burglary were punished on the same principle. Who would not poach if the punishment were twice the value of the game found in the poacher's possession? Yet the punishment on conviction for first offences scarcely averages twice the value of the property stolen. Forest property is similar to game, it is widely dispersed and difficult of protection. It is as easy for a Kaffir to slip into the forest, cut a sapling, and sell it as a pole at the nearest canteen, as for a poacher to knock over a pheasant. Game cannot be protected without game laws, nor forests without forest laws. Game has practically disappeared in France with the abolition of the game laws: the forests would follow were the forest laws to be abolished. In other countries where forests have to be conserved, special enactments dealing with forest offences have been found necessary. Forest offences ought to be chargeable as such, and special penalties provided, which would bear some relation to the damage done to the forests, and to the inherent difficulty and expense of proving forest cases. In India, several Acts have been passed within the last fifteen years. France, Germany, and other European countries have their forest codes. The attempt to preserve the forests of Cape Colony without a Forest Act, must inevitably end in failure. People have not yet learnt how little there is to fear from forest prosecutions, or forest offences would be commoner than they now are. Occasionally an energetic magistrate deals out an adequate sentence, and the effect of this is magical. The wholesale stealing of

sneezewood poles in Stutterheim came to an end as the result of one forest case early in the year. But in the absence of a Forest Act sentences for forest offences can rarely be adequate. To instance—firewood stealing: A sharp man will probably steal several loads of firewood before he is caught Let us assume that on an average his third load lands him in a court of justice: his average punishment, if convicted, would now be about double the value of the wood stolen. And thus it pays this man better to steal firewood than to pay for it, under the present state of the law! Fortunately this is not generally known, and that even the light punishments awarded have a deterrent effect, is shown by the fact that no person has been brought up twice during the year for forest offences. And I have the evidence of independent persons that firewood stealing at the present moment is not the popular pursuit it was. Gradually, however, as the fact becomes known that there is no adequate punishment, the offence will once more become common. To turn again to the profit and loss account of wood stealing: while this pays a man under the present law, the final loss to Government is large, even in the case of successful convictions. The small fine imposed may average two-thirds of the value of the wood stolen on this, and on previous occasions, but there remains the damage to the forest done by cutting all sorts of trees, and by cutting in the wrong place, the expense of summoning witnesses (always from a distance in forest cases), the time of the court, and the time of the forest officials spent in tracking the delinquents, hunting up evidence, going backwards and forwards to town to make affidavits and give evidence in the cases. To simplify this procedure the Conservator of forests should have magisterial powers to deal with small offences; and that his zeal may not outrun his discretion, it would be sufficient to provide for an appeal to the nearest magistrate. But perhaps where the want of a forest law is most acutely felt is in the fact that as the law now stands it is a matter rather of personal opinion, than of duty with a magistrate, whether he shall trouble himself at all about forest cases. On the one hand, there is the difficulty of knowing how to deal satisfactorily with forest cases under the obsolete Forest

Act, and the doubt whether the evidence is good enough for trying the offence under common law; on the other hand, personal opinions—are the forests worth preserving? is the attempt to do so being conducted in the right way? why not leave the forest to take care of itself? These and other questions must arise; and I submit that it is inconsistent, when the preservation of the forests has been determined upon, that there should be any difficulty, doubt, or personal bias, in dealing with forest cases.

'Forest offences should be charged before a magistrate under the proper section of a regular act, and not left a question of personal opinion. As an instance of the anomalies existing under the present state of the law, there is the curious fact, that on the frontier, the nearer a man is to the coast, the easier it is to steal firewood! At East London, firewood stealing is an honourable and lucrative profession, even when boxwood, worth one penny a cubic inch, is stolen and sold for firewood. At King William's Town the average of sentences has been light, and an active man working in the south of the division, where there is a forester wanting, could perhaps make firewood stealing pay. At Stutterheim a firewood stealer would obtain a patient investigation of his case, but he would probably soon decide to seek the milder climate of the coast.

'There is another way in which the forest cases suffer at present. If the magistrate refuses to entertain the case nothing more is heard of it. If, on the other hand, he tries and convicts, the case goes probably to the Eastern Districts Court for review, and may be quashed. A magistrate may be equally in error in refusing to take up a forest case, but of this the judges hear nothing. I would suggest that where a magistrate refuses to entertain a forest case, he should take the affidavit of the forester, or whoever reports the case, and add his reasons in writing for not taking it up. In important cases it is desirable that the Conservator should attend to prosecute, and in all cases, if only for the proper working of his department, the Conservator ought to have the opinion of magistrates on the cases brought before them. At present the foresters report their cases to the Con-

servator, but when these cases fail he only hears the forester's side of the question.

'A parallel has been drawn between private owners of forests and Government, and objection made that if private owners can do without special legislation why not those in charge of Government forests; but this parallel, a moment's consideration will show, is illusory. When a private owner really preserves his forest he fences it and warns off the public. This cannot be done with Government forests, both on account of their extent, and the fact that they are the property of the country, and exist for the use and enjoyment of all.

'The following are some of the more salient points which would require attention in a Colonial Forest Act.'

These relate to—Reserved forests; marking of timber; passes for firewood; police powers; petty magisterial powers; power to seize; cutting and removal; refusal to produce license; firing a forest; goat grazing in a reserved forest; compounding for forest offences; evidence in forest cases.

There are given copious illustrations of what is desirable in the several matters embraced in his remarks; and in order to complete his recommendations on the subject, he adds a series of notes on the Forest and Herbage Act of 1859, stating his opinion of what should be retained and of what should be altered. To this there follows a list of 35 species of timber trees found in the Eastern forests, in which are given the common, the Kaffir, and the botanical names of each. And he proceeds:—

'*Restriction on re-sale of alienated forest.*—To repair, as far as circumstances will allow, the mistakes made in alienating slices of forest land in the midst of important forest reserves, it would be well to insert some regulation with regard to the re-sale of these forest properties. Often Government has the right to refuse to title-holders the permission to sell. In the case of private owners of forest whose holdings are surrounded by, or contiguous to, any block of reserved forest, it would be well if permission to sell were refused, except on the recommendation of some competent forest official. The present owners having

obtained these forests usually at little more than a nominal price, they could not reasonably object to Government exercising such rights as it possessed over the forest in the interest of forest preservation. Rules providing for the redemption of alienated forest should also be promulgated, and might conveniently be included in a Forest Act.

'The leading sections of the Madras Forest Act of 1882 appear applicable, with but little modification, to the present wants of Cape Colony in the matter of a forest Act.

'*Forest fires.*—In the Amatola forests there have been no severe fires during 1884. In the large masses of forest on the southern slopes of the mountains, facing the sea, there is little danger of fire, the heavy rainfall, the steep gradients, and the cool southern aspect, combining to render the forest always moist. Extensive grass fires occurred during the winter, but the fire did not get into any block of forest. On the tops of the mountains, where the forest is more scattered, and the advantages of aspect is lost, the danger from fire is greater. The whole of the upper portion of the Perie range, including the beautiful Evelyn valley lying to the west of Mount Kemp, was burnt over this year as it had been for many years past. This fire began on the 26th of July, and lasted, on and off, for a fortnight. It was impossible at the time to do anything to arrest it, as the forest had not been demarcated. This fire originated in the burning of the grass for their cattle, by the Gwili-Gwili and Gobo-Gobo natives on the north and west of the range. Four of the Gwili-Gwili natives were caught by the Isidenge forester in the act of cutting and burning the forest, and were punished under the Forest and Herbage Act. But to arrest the fires in the Upper Perie forest general measures, which I hope to see accomplished this year, are necessary:—1st, the forest boundary must be settled; 2nd, a few fire-paths must be made round the patches of partially destroyed forest; 3rd, in the recently burnt forest where the soil is clean, the forester will put in acorns; 4th, in the parts where nothing but a few old stumps remain to show that it was formerly forest, the grass must be broken up, and the soil got ready for re-foresting, by

forest cultivators. Offers have been made by several respectable natives to come as forest cultivators, as soon as the demarcation is finished, and they can obtain security for their crops against cattle and fire. It is painful to see so many square miles of perhaps the best watered country in the Colony, devoted to little else but the fitful grazing of a few cattle during the droughts of summer and mid-winter. On these mountains, the naturalized oak and the eucalypts from the cooler parts of Australia, flourish to perfection. On the east side of Mount Kemp is the oak whose dimensions have already been cited; and on Mr Smith's farm, a few miles further towards Stutterheim, are some rows of well-grown blue-gums with a *natural reproduction* better than I have seen in the case of blue-gums grown in the Cape peninsula. On the slopes of Mount Kemp are a small quantity of flourishing young oaks, sown last year in part of the Gwili-Gwili forest.

'When the cattle, now roaming over and destroying the forest on the upper slopes of the Perie range, are kept within their own boundaries, the grass on the grazing grounds will be more eaten down, and little or no burning will be necessary. On the Hogsback, and the upper Amatolas generally, grass fires are becoming yearly less fierce as the grass is more grazed by stock. I have suggested the survey of a few more farms between the upper boundaries of the Amatola forests and the Bontebok farms. Were this measure carried out, and the cattle belonging to the native locations below the forest kept strictly within their own grazing grounds, there would be little waste grass, and grass fires would be reduced to a minimum. In the large blocks of dense evergreen forest, numerous fires were lit during the winter, mostly by Kaffir hunting parties, but in no instance have these spread; not more than the single tree lighted being actually destroyed. Though the year's rainfall is eleven inches below the average, the winter droughts were not severe, heavy and abundant rain having fallen as late as June. In Stockenstrom, where the forests are in an over-worked, open, and dangerous condition, such as exists nowhere in the Amatolas, rain fell just in time to prevent another of those terrible fires which have wrought such ruin in the Katberg

forests. Of this I shall speak more particularly when describing the work done in the Stockenstrom division. In the Amatolas, as has been mentioned, the forests generally are not in a dangerous condition. This is proved by the numerous grass fires which have tested the dense growth round the margin of the forest, and the numerous isolated fires which have occurred in the interior of the forest, lit generally by the native hunting parties. I am able to report that native hunting parties, in consequence of the action taken by the Forest Department, have become less frequent. Undermanned and overworked as it is, the Forest Department had no choice but to endeavour to stop these hunting parties: fires were being lighted in every direction, sometimes as many as six or eight fires in one forest in one day. The foresters took the matter up as soon as they had got a roof over their heads. Some cases were reported to the police, who searched for arms; prosecutions were also undertaken under the Peace Preservation Act, as it is easier to prove the possession of arms than the act of firing the forest. As a result, the large organised drives by which all the game would be swept out of several square miles of forest, have been put a stop to, and smaller hunting parties, with their attendant fires, are now rare in the forests provided with foresters. It cannot be considered unfortunate that some practical steps have at last been taken to preserve the game, which was becoming extinct even more rapidly than the forests were deteriorating.

'*The police and forest departments.*—A measure which would have the most useful results, but which would probably require some special provision in the estimates, would be the formation of a few mixed forest and police appointments. Or the same end would be served by detaching a few native constables for special duty with the European foresters. The object of the arrangement is this:—Outside the forest boundaries are stationed police who have nothing to do till called away for thefts, or other police work. Inside the forest boundaries is a valuable property which requires constant watching to protect it from depredation. Stock thieving very frequently ends by the stock stolen being driven into the

forest and slaughtered. It would make these police more efficient men at their own work, if, when not occupied in tracing stolen stock, they were employed under the forester on ordinary forest work. And the forester's hands would be immeasurably strengthened by having the police with him, and available for the ordinary police work of the forest. The proposal, therefore, is to station one or more constables with each forester to be employed ordinarily on the police work of the forest, but immediately any stolen stock or other criminality had to be tracked into the forest, the police would call on their men at command who knew the locality, which is everything for thief-catching in the forest. The bones which have been found in the forests show that stolen stock has been taken there and slaughtered in large quantities. In these and other matters the forester living always in the forest, with his native forest cultivators around him, could certainly afford assistance to the police, and he would do so, *con amore*, in return for assistance in his police work of the forest.

'I should state that I have mentioned this subject to Mr Davis, the Commissioner of Police, and that it meets with his approval. The arrangement might be carried out as a purely police measure, or sanction asked for the necessary extra expenditure on new appointments. In the latter case it is right to enter an explanation of the proposal here.

'*Roads, buildings, fencing, line-cutting.*—Two roads have been made during the year, one a waggon-road through the upper portion of the Amatola-Nuka forest, the other a bridle path through the centre of the Perie forest from the forester's cottage to Fort Evelyn. It is astonishing what a large area of virgin forest exists, only requiring for its development roads which could be made for less than the value of the timber on them.

'During the year five foresters' cottages have been erected as described when speaking of the foresters. Six more foresters' cottages should be erected during the ensuing year, to complete the number required for the proper supervision and restoration of the forests. Provision has been made for these in the estimates.

'As was mentioned in the report of last year, fencing is necessary at various exposed parts of the forests. All the nurseries have been, or are being, fenced. In some places it is proposed to put up live fences, but wherever a fence is required to keep out cattle or goats, a five-wire fence on sneezewood poles is used. . . . Fencing is necessary for the Kata forests, to protect them from the considerable quantity of goats reared by the natives in the valley. Also, as a police measure, interfering with the easy passage through the forest of stock stolen from the farmers on the flats, this fencing in the Kata valley should be extended and completed as early as possible. I should suggest that a fixed sum be allowed in each year's budget, say £800. This would be expended mostly on wire, the foresters being employed during the slack time of the year in fencing those parts of the forest which, from their situation, are unusually exposed either to cattle trespass or wood stealing.

'During the year numerous boundary lines had to be cut through the forest; these have been referred to under the head *demarcation*. On account of the cost, few of these lines have been opened to their full width by departmental labour. A staff line, of a yard in width, is run through the forest, and arrangements are then made for the opening it out to its full width according to the value of the wood on the line. It is proposed to follow the same plan when the forest is laid out in sections for systematic working.

'*Sectioning the forests.*—During the year the necessary work of laying out the forests in series, of sections, or compartments, for regular working has not been undertaken, owing to the pressure of more emergent work. Till the forest is demarcated and surveyed, it would evidently be premature to mark off sections for working.

'It is impossible in the Amatola forests to say what is Government forest and what is not, till the Government forests has been surveyed and demarcated. Undoubtedly, were there a great demand for timber, sections could be laid out provisionally to meet the demand. But in the Amatola forests, so far from there being any great demand for timber now, it is

with difficulty that we can dispose of dry building timber, of average quality, at half rates. For waggon-wood there has absolutely been no demand. Most of the dealers have large quantities of old stock still on their hands. As has been already mentioned, the selling of timber by measurement, instead of charging an average price for all logs, has rendered marketable a quantity of small logs and refuse timber, which buyers would not look at if they had to pay for each piece of timber the price of a sound log. The ill-advised sleeper fellings also left much refuse timber on hand. Dry yellowwood in the damp atmosphere of these forests decays rapidly, and the majority of the hardwoods are little longer lived. This refuse timber will therefore be soon exhausted, what is still unsold becoming unsaleable. During the ensuing year the green timber on numerous demarcation lines, and on several roads to be opened, must be sold for what it will fetch. To open sections for felling immediately would be to spoil the market for refuse timber, and for timber on the roads and lines which we are forced to sell, for were these lines not opened out at once the flags on the staff lines would get lost, and they would have to be laid out over again. To cut this timber by paid labour, and then leave it rotting on the ground, is an alternative not to be thought of when the timber can possibly be sold, or even given away gratis, or with a bonus. Most of the heavy demarcation line cutting will be finished about the time that the survey of the proposed Mount Kemp forest reserve is completed, and it is precisely there that sectioning should be done first, in order to control the firewood cutting for the King William's Town market. It is proposed, therefore, during the ensuing year, to finish the demarcation and survey of the Mount Kemp forest reserve, and then to proceed at once with its division into a series of sections or compartments. The local experience gained by a two years' residence in these forests will then be available for the practical details of the working plan.

'A linear survey has been completed in the Perie forest, but the results cannot be shown in this report.'

There follow reports on the Stockenstrom forests in the Katberg; the forests in the divisions of Victoria (East); the

East London forests; the Bathurst forests; the Kawn Bush; the Alexandria forests, and the Transkeian forests; all of them interesting and instructive, but the last alone do I quote:—

'*Transkeian Forests.*—There has been some correspondence during the year on the subject of the destruction of forests now taking place on the extra-Colonial side of the Kei River. It appears to be admitted that these forests are of larger area, and better stocked, than those within the Colony proper. Many of these forests contain, what is not met with in the Colony, sneezewood and stinkwood growing side by side. For although some small specimens of stinkwood were found by Count de Vasselot at his last visit growing in the Amatola forests, and although it has since been proved that these Amatola specimens are identical with the black, or Knysna stinkwood (Oreodaphne bullata), yet, in the Amatolas, stinkwood is so small and scarce that it must be considered as nothing more than a botanical curiosity. In spite of the value of the Transkeian forests, both intrinsically and climatically, it seems admitted on all sides that their destruction is proceeding rapidly. And, in proportion as the country is settled, is the destruction more rapid. During the year I have brought to notice the legalized destruction of the forest so favourably situated near the Cala township. In the most advanced parts of the Transkei it appears that the fatal time licenses for timber are still issued. It is argued that the country is not sufficiently advanced to pay for the protection, or systematic working, of the forests, that they are doomed to destruction, and that it is better the Government should obtain something of the spoil. Nothing could be more short-sighted than such a method of reasoning. It is the opinion of a large number of people that the destruction of the forests mean the deterioration of the most fertile, and the disfigurement of the only beautiful parts of the country. It is admittedly the duty of Government to do what is practical to preserve the forests. Whatever view may be taken as regards the future of the country, it is as much the moral duty of a civilized Government to set its face against forest destruction in these latitudes, as it is to discoun-

tenance any other social evil, such as slavery or witchcraft. No one would propose that slavery or witchcraft should be encouraged in the Transkei, for the sake of a few hundred pounds revenue. Yet there are countries where events have shown that the temporary evil of slavery is as nothing compared to the irremediable mischief of forest destruction. Now in the Transkei it should be the declared policy of Government that forest destruction is to be prevented by every lawful means. Time licenses should be abolished there, as they have been abolished this side of the Kei. To allow a sawyer and his party to destroy a forest wholesale for a nominal fee of 5s per month is inconsistent with the instructions issued to magistrates, the precaution taken in leases to reserve the forest above five acres in extent on farms, and the declared policy of Government on the subject of forest preservation. Numerous sawyers, unwilling to conform to the forest regulations, have gone over the Kei, and from thence sent timber here which can drive out of the market that which has been paid for, selected by the Forest Department, and cut according to regulations here. I trust that this question of time licenses in the Transkei will receive early attention. Time licenses are simply licensed destruction. Their yield is but a fractional part of the destruction which they legalize, and against this trifling yield must be set a direct loss of revenue from legitimately worked forests on this side of the Kei. Generally speaking it should be laid down that if a district is too poor to pay for the systematic working of its forests, it should be compelled by Government so to work the forests that it may be reasonably supposed that the yield of the forest is not being exceeded. And as exact methods are not attainable, the error must be an error on the side of safety. Fellings should be restricted to refuse timber, to timber above a certain girth, to timber which has been ascertained to be really damaged or faulty, to timber which is not near streams nor the margin of the forest. *No green tree should be permitted to be felled till it has been inspected by some competent authority*, stamped on stump and stem with the Government mark, and certified to be exploitable under the rules. There should be an unconditional prohibition of the

cutting of round sneezewood poles, and as a rule the cutting of green sneezewood timber should be prohibited, or placed under special restrictions. There is no great loss in not cutting green sneezewood, as the heartwood remains sound an indefinite time after the tree has died. Bushworkers should be certificated by a magistrate, and any attempt to steal wood or break regulations should be followed by the suspension, or loss of certificate. If the bushworker complains of a loss of livelihood it will be no hardship to ask him to migrate to this side of the Kei where supervision is easier. In independent native states, such as the Pondos, with their fine strip of forest running up to St. John's River, the policy should be pursued of setting our faces against forest destruction as firmly as other moral evils are faced. Cruisers are maintained on the West Coast of Africa from purely sentimental and philantrophic motives. But when our neighbours propose to destroy their forests, not only are they ruining their own country, but they are decreasing our rain supply. Every tree, be it remembered, is a distributor of watery vapour, drawing moisture from sources which cannot be touched by mechanical means. This is a simple physiological process capable of easy demonstration. Should we permit our neighbours to cut off the scanty water supply which nature has given us in this dry country? Unless history is to be thrown into new channels, these native states are the future homes of many of our race, and foresters are compelled to look forward. Some of the noble yellowwood trees now being given away to refugee sawyers over the Kei could not be produced under a couple of centuries. I make these remarks with the object of urging that the timber trade from native states should be looked on as immoral, for exactly the same reasons that the liquor traffic is looked on as immoral, and laws passed for its suppression in native areas. A native owner can no more be trusted with forests than with alcohol. If it is our duty to refuse to supply him with alcohol, it is doubly our duty—our duty both to him and to ourselves, to refuse to purchase his timber. The timber trade in native states should be declared illegal, and timber coming from native territories, seized as contraband. Were this policy adopted I am convinced that

the forest destruction in native states would be reduced to a minimum. The raw native is a wanton destroyer of forest, but it is on a small scale. He cuts down or disfigures a tree for the sake of a bees' nest; he takes out saplings here and there as poles for his hut. But it is the semi-civilized native, the owner of a waggon, who is the real forest destroyer. This class could be reached, and their labour turned into more commendable channels, if the wood and timber trade, from native states, were declared illegal.

'*Increase of the duty on imported wood.*—Owing to the slack demand for house building wood, and the competition of imported deals, the market price of sawn yellowwood planking has been very low throughout the year. The average price of planking has not been more than from ten to twelve shillings per one hundred running feet, or say little above one penny per running foot, or one shilling per sawn cubic foot. When it is considered that not many years ago large quantities of planking were sold at as much as £2 the 100 running feet in King William's Town, it will be recognised how prices have been forced down in recent years. Many of the old sawyers have gone over the Kei, where wood can be had at nominal prices on time licenses. Others remain here, working as forest cultivators in the summer, and as sawyers during the winter, an economical and satisfactory arrangement, which, I hope, may long continue. But the low price to which Colonial wood has sunk has almost ruined, not only the bushworkers, but every one connected with the home timber trade. The various saw-mills, at King William's Town and in the country, are either closed, or working at a loss. Yellowwood planking is superior to American, especially for flooring; home-made joinery is better than American; but both the one and the other have been gradually undersold, especially since the port and railway at East London have come into existence. It is the history of a home industry almost ruined by an unfair competition; and the remedy would be admitted by the most old-fashioned free-trader, were he also a forester. . . . The forests here have never possessed the bulk of material within a small area,

nor the unrivalled water carriage, that exists in the pine forests of American and Sweden. But our forests will of course improve as they are conserved and planted. And as systematic working extends, age-classes will develop, and then all the mature timber will be in one spot easily got at, and cheaply worked, and if water-carriage is wanting, it must not be forgotten that there is easy access from all the eastern forests to the railway. The situation, therefore, is this: Colonial wood, which is now inaccessible and costly to work, will become gradually better and cheaper. Foreign wood will become dearer, with the exhaustion of, or introduction of systematic working of the forests of America and Sweden. For some years to come, the revenue from Colonial forests must be supported, and the Colonial wood industries be protected, by high duty on foreign wood. The only argument against such a course would be that it would make wood-work dearer than it now is. To this it may be replied that wood ought to be, and would naturally be dearer than it now is, but for the recklessness of our neighbours, and the geographical accident of a cheap sea-carriage to the two largest timber exporting countries in the world. Cape Colony with its few home industries, its dry climate, and its precious mountain streams, its desert Karoo and beautiful forests, dare not do otherwise than protect its forests and forest industries. As a matter of pounds, shillings, and pence, it is surely sound economy to consent to dear wood for a few years now, in order to have cheap wood growing in our midst hereafter. The question of an increased duty on wood should be looked at from a forestal rather than a politico-economical point of view. It need hardly be pointed out that forest economy is a chapter containing much that is contradictory to the ordinary laws of political economy. The law of supply and demand, for instance, has only in some very exceptional cases produced forests. State ownership and management, the worst for most descriptions of property, are the best for forests. In this question of a greatly increased duty on foreign wood, the one object to be kept in view is to free our forests from the disastrous competition of forests worked destructively.'

Corresponding reports were made from other forest districts but those quoted give a fair representation of the work carried on.

In the report for the following year it is stated, in regard to the mountain forests in the divisions of King William's Town, Stutterheim, Victoria (East), and Stockenstrom :—

'The recent Forest Commission having reported on the demarcation and other matters connected with the high-timber forests of the mountains, many matters which should be recorded in an annual report need not here be repeated. The enquiry into, and confirmation of, the forest boundaries, has been of great utility; and the small alterations made in the demarcation lines, though they have given the forest a less regular, and consequently more costly boundary, were, under the circumstances, unavoidable. It is probable that in some instances these irregular boundaries will be rectified by subsequent agreement This is however of secondary importance. The primary fact remains that all the large forests on the Amatola and Perie mountains, and what remains of the Stockenstrom forests, have now definite barriers against further encroachments.

'A reorganization of the forest staff has permitted, without extra cost, the provision of the minimum number of foresters required for the protection and working of the mountain forests.

'Thus, with the establishment of definite boundaries for the forests, means have been found for a due enforcement of these boundaries. The average area of forest in charge of each forester now averages about 13 square miles.

'The reforesting and tree-planting performed by the new foresters has proved successful, and the cost of these operations has not exceeded the very low figure estimated. In fact, the cost is only that of seed and of a small allowance to the foresters on the number of trees planted.

Forest fires have been practicably limited to the Stockstrom division, where special measures are being taken to prevent their repetition next winter,

'The number of forest prosecutions undertaken by the conservator, rangers, and foresters, amounts to 66 cases during the year, of which 40 cases were successful, 11 unsucessful, and 15 abandoned owing to delays in the magistrate's court at King William's Town.

'The revenue remains nearly the same as last year, the small decline being in the Stockstrom division, where the forests are almost destroyed, and must be closed for many years, except for absolutely decaying material.'

There follow similar reports of the coast forests, and reports of work done in surveying, and in demarcation; and in regard to the foresters and their work, it is reported:—

'The new system of foresters, of which the details were sketched in last year's report, has been a success. On this system each forest is in charge of a resident European forester, a working man, in place of the ranger and wardens, whose functions consisted in riding about and reporting. With the exception of one man, who was dismissed for dishonesty, all the foresters have worked well. The native guards who were appointed with the foresters, have worked fairly; but their services amounted to this: when actually with the foresters they worked well; but in any situation of trust, the old corrupt traditions of the native wardens became apparent. Under these circumstances, the native guards were no better and no worse than day labourers, and an economy was effected by their retrenchment.

'On the reorganised staff which has come into force since the close of the year, there are 13 foresters.'

The names and stations of these are given, and the report proceeds:—

'Those marked with an asterisk receive £5 per mensem, the remainder £4. Forester Winther has been promised promotion, at the first opportunity, to £5 per mensem. The conditions under which the foresters worked having formed the subject of correspondence and practical trial during the last two years, it was found convenient, when the foresters

were appointed, to embody their conditions of appointment in a brief statement for the guidance of the new foresters.

'*Conditions of appointment for Foresters.*—Monthly pay, £4; bonus for planting, 10s per 1000 for passed nursery plants; 10s per 1000 for one foot trees passed as established in the forest; or, for nursery work and transplanting, £1 per 1000 passed trees.

'A bonus cannot exceed £40 per year, without special sanction. Each forester is expected to raise 40,000 young trees annually. Indigenous seed is to be collected: exotic seed will be supplied.

'Rewards for good cases are given from time to time for the successful prosecution of forest cases.

'An allowance of 3s per day, when a forester is compelled by his duties to be absent for more than a day from his home. In travelling, 30 miles count as one day.

'*Quarters and Garden.*—Foresters are provided with a house and ten acres of irrigable garden land. A forester's interest in his house and garden ceases from the date of the termination of his appointment. His garden is intended for the sole use of himself and family; and he is not permitted, except with special sanction, to sell any crops or produce he may raise. He is forbidden to engage in farming or any occupation whatsoever outside his duties as forester.

'*Grazing*—Each forester is allowed grazing for twenty head of cattle and two horses, provided there is waste land available within the forest boundaries. In return for this privilege he is expected to provide such dung as may be necessary to manure the forest-nursery. Sheep, with sanction, may be substituted for cattle; but no goats are permitted within the forest boundaries.

'*Firewood.*—Dead wood only free.

'The six foresters have 138,080 plants now in their nurseries. They have planted out during the year 63,885 young trees from

the nurseries into the forest. They have sown in properly prepared ground 86 sacks (grain bags) of acorns and 1000 lbs. of stone-pine seed on deforested areas within the forest boundaries. These seeds are sown sometimes in holes at regular distances apart, and sometimes broad cast when the crops of the forest cultivators were sown or weeded. Nothing but the absolute failure of funds to buy seed prevented the considerable extension of these re-foresting operations, Eight water-furrows have been dug to irrigate the various nurseries, and two and a-third miles of wire fencing has been erected. The foresters have also been employed in building beacons and in road-making. The forest beacons are mounds of earth and sods, with stones on top, and are larger than ordinary beacons. Forester Winther, with a boy to assist him for two months, has built 292 beacons. None of the foresters has worked better than he. Forester Budge, with a small labour party, has nearly finished the Fort Evelyn road through the Perie forest. To give the details of each forester's work would occupy too large a space. I shall therefore show the number of plants now in the nurseries, and the number of transplants put out into the forest, in two statements, and add thereto the returns from the East London and Cathcart plantations.'

There is given a tabulated statement of the number of trees of different species in the nurseries in each forest at the end of the year, in all 138,080; and of the number of transplants, in all 66,683. A report of the East London rangers nursery, of the Cathcart plantation, of the good results from the employment of cultivators, of what had been done, and was being done, in the construction of roads and buildings, of the conviction for forest misdemeanours, of the desirability of plantations on the grass lands of the Amatola and Perie mountains, with a report on a site deemed suitable. There are next discussed the minor forest products which might be exploited, the forest revenue of the Colony, and the light thrown by it upon what might be realised in the eastern division, and the hindrances to this being at once secured.

And there are appended a statement of the actual cost of a model cottage for foresters, amounting to £31 11s 10d; a report on the East London forests, by Captain Ricketts, forest ranger; and on the Alexandria and Zuurberg forests, by the ranger, Mr. Nightingale.

Citing these reports as indications of the progress made in the improvement of forest administration and management under the new regime, I have confined myself to compiling the reports made without discussing at the same time what is advanced.

PART III.

CAUSES AND OCCASIONS OF THE GREAT DIFFERENCE BETWEEN THE RESULTS OBTAINED FROM THE MANAGEMENT OF THE FORESTS UNDER THE OLD REGIME, AND FROM THE MANAGEMENT OF THE FORESTS UNDER THE NEW REGIME.

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THE information embodied in the preceding parts of this volume may be to some extent interesting to students of the forestry of different nations; and the details given may not be altogether without use, in suggesting to such, or to others having an interest in the maintenance and exploitation of forest measures, which in like circumstances might be avoided, or might be adopted with advantage to all concerned. But the object kept in view in advancing them was to aid in making more generally known in English speaking Colonies and States, some of the advantages which might be anticipated from the adoption of the advanced forestry of the day, in the adminstration and management of extensive forests; and to do so by placing in contrast the results obtained in a specified case from the management of such forests under the old regime, and those obtained from the management under the new regime of the same forests, after they had become still further devastated. In furtherance of this object, I proceed to adduce some of the salient points of difference, observable in the adminstration and management of these forests under these different regimes, to which may be attributed much of the difference seen in the results.

Under the new regime, we find the forest administered and managed in accordance with the most approved forest economy

of the day, which is essentially conservation of the forests; while under the old regime, we find that they were managed in accordance with an old method of exploitation, handed down or perpetuated from the barbarous times of savage life, which method is essentially destructive.

Under the new regime, we find the forests are under the administration and management of professional foresters prepared for the work by appropriate education, training, and instruction in the advanced forest science of the day; while under the old, the work was entrusted to civil commissioners, district magistrates, veldt cornets, and others altogether destitute of the education, training, and instruction referred to, and under whom were tolerated practices which enlightened foresters condemn as detrimental to the proper conservation of forests.

Under the new regime, we find an expenditure on the administration and management of the forests which is reasonable and liberal—an expenditure which is in accordance with what is spent on similar work elsewhere, and justified by the increased proportional returns in excess of expenditure which were received, and the improvement thus effected on the condition of the forests; while under the old regime there was a parsimony in the provision for meeting the expense of the work, not in keeping with the expenditure of the Colony on the administration of the Government, and on the administration and management of other enterprises, having for their end the development of the capabilities and resources of the Colony, and altogether out of keeping with the importance to the Colony of the conservation, extension, and economic exploitation of the forests belonging to the Crown.

The following are facts adduced in illustration of these averments, with illustrations of other differences which have manifested themselves in accordance with some one or other of them.

CHAPTER I.

FOREST EXPLOITATION.

It may have been remarked that in the narrative of what has been done under the new regime of forest management at the Cape of Good Hope, no mention is made of artificial stimuli being applied to increase the productiveness of the forests, and in accordance with this it may be observed, when attention is directed to the matter, that there has simply been an avoidance of waste which was going on under the old regime, and the adoption of appropriate measures to prevent waste and destruction of the forests otherwise. Mention is made of something having been done in replenishing exhausted forests, and of new plantations; but within the period embraced by the reports quoted, no pecuniary returns have been received from these; and almost the same may be said of endeavours put forth to secure a place for forest products in the markets of the world From this it seems to follow that the increased pecuniary returns obtained and anticipated may be looked upon as representative of the normal productiveness, the defection from which, under the old regime, may be considered not as negative but as positive evil, resulting from actual wasteful and destructive mismanagement; and on examination of the records, we find that such was the case, with the evil increased by the neglect of the enforcement of appropriate checks upon abuses which had been provided by the legislature of the Colony.

Viticulture, horticulture, agriculture, and sylviculture—all of them, in order to success, must be conducted in accordance with the physiology and natural history of the subjects of culture. This holds true in regard to the reaping as well as to the sowing and protection during growth; and the essential difference between the forest economy under the old regime at the Cape of Good Hope and that under the new is this: under the old regime the forests were treated in accordance with a method

of exploitation perpetuated from the barbarous times of savage life, which is reckless of consequences; but under the new regime they have been treated in accordance with what is known in regard to the physiology and natural history of the trees, embodied in the most advanced science or systematised knowledge of the day.

We have, in the reports cited in the Second Part of this volume, statements indicative of what the most approved forest economy of the day is; and in successive reports details of operations which indicate that they were in accordance with these; and we have statements cited in the First Part of the volume not less indicative of the forests having been administered previously in accordance with a method of exploitation known in scientific treatises on forestry as *jardinage*, the tendency of which, when recklessly practised, is to devastate and destroy the forests subjected to such treatment; and of this result extensive forest districts in the Colony supply an illustration.

Section I.—Destructive Tendency of Jardinage.

Jardinage may be described shortly as felling such trees as may be considered likely to serve some purpose for which they are wanted, leaving the others to stand if they do not happen to be broken over by the falling tree, or happen to stand in the way of bringing out from the forest that tree or such portion of it as may be required—but freely sacrificing any which may happen to be crushed or require to be removed to facilitate this operation.

It seems natural that such a course should be followed anywhere and everywhere. It was practiced by the Bechuanas and other native tribes of South Africa before the immigration of European colonists; and by the colonists, Dutch and British alike, the practice was continued and virtually legalised by the issue of licenses by the Government for the felling of trees in the forests subject only to restrictions as to kinds and quantities specified in the license. It may be characterised as reckless rather than as destructive when thus legalised, but

it is not less destructive in its results; and it is the recklessness of results which calls for condemnation. In regard to the destruction of forests following its practice in the Colony I have had occasion in another volume* to give details of successive stages of destruction thus affected in specified forests of the Colony. These may be taken as a fair illustration of the destructive effects of this method of exploitation when carried out extensively free from restriction: and full freedom of action in creating devastation was allowed it by licenses which were issued. If this may be said of licenses issued on payment of a prescribed charge, it may be said with equal truth and more manifest truthfulness of licenses which, under the old regime, were issued free of charge as concessions to contractors engaged in the execution of works of public utility. But thus is opened up another aspect of the subject.

Section II.—Wasteful Concessions of Growing Timber made under the Old Regime.

Similar in many respects to the licenses issued under the old regime, were the concessions of growing wood made to contractors and others engaged in works of public utility, but they were often more destructive to forests than the licenses referred to being more liberal, and virtually investing the holders with a kind of official character superior to that of the forest warder, and against which the Conservator of the forest might be powerless. The practice is condemned by students of modern forest economy.

At an early period of the introduction of this into the management of forests in India the practice in question was abandoned, and there was substituted for it, where the circumstances seemed to require some form of concession, an order on the Forest Department for what was required to be felled and delivered by them, and this Department charged the Government with the amount of the value of the grant.

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* *Hydrology of South Africa; or Details of the Former Hydrographic Condition of the Cape of Good Hope, and of Causes of its Present Aridity, with Suggestions of Appropriate Remedies for this Aridity.*

Captain Harison, Conservator of the forests in the electoral division of Uitenhage, in the beginning of 1865 called my attention to the subject in the following terms:—'Let me beg of you, as a commencement of reform, to impress on the Government the ruinous results attending the barbarous practice of allowing public companies (as did lately the telegraph company), to cut our young forest trees for poles. Some thousands of the most beautiful upright yellow woods were some time since converted into telegraph poles, which, I hear, already require replacing. Such a forest system is disheartening in the extreme. The poles could have been supplied from the forests, sawn from old short stinkwoods. They would have cost little more, have been uniform in appearance, and all but everlasting. The forests would have been at the same time benefited by the removal of useless cumbersome old stumps.'

In the report on the Crown forests in the district of Knysna for the year ending 31st December, 1861, it is stated:—'There has been a slight decrease in the number of licenses during the year, owing chiefly to the depreciation in the price of timber, and on account also of the issue of free licenses; but, nevertheless, the demand for timber has been tolerably good throughout the year, and there is no reason to doubt that the revenue derived from this source will yield a fair return during the ensuing year; and when the time arrives that this district can have easier means of communication with the adjoining districts, the increase in the sale of timber will be considerable.

'The system adopted by Government of issuing free licenses should be discontinued, as it is alike injurious to the forests as well as to the revenue, and in very few instances do the public works benefit to the extent it is contemplated by this system.'

In the next year the Conservator reported:—'During the past year there has been a decrease in the number of licenses issued as compared with the year 1861. This is owing partly to the system which obtained of granting free licenses, but which, I am informed, has been discontinued. I have been here so short a time—about fourteen days—that I have not as yet been able to form an opinion on the state of the forests or working of the present system of licenses. I have learnt,

however, that the wood-cutting trade is on the decline. This is I think owing in some measure to the necessity apparent to the farmers of more extensive cultivation of the soil, and also to the depression of trade and consequent small demand for timber.'

Mr Fichat, the Conservator, having been removed to Bathurst, Mr Blake, the resident magistrate, by whom that report was made, was appointed to act as Conservator, with an allowance apparently for forage, and he gave the following report on the Crown forests of Knysna for the year ending 31st December, 1863:—

'There has been a falling off in the revenue derived from the Crown forests during the past year, which may be attributed partly to the small demand for timber, owing to the depressed state of trade, and I think also to the fact that Colonial woods do not bear a very high character in the market. Since my appointment to this place I have visited the greater part of the forests in different directions, and could not help being painfully struck by the waste of timber which I saw in them. I have no doubt that there are hundreds, if not thousands, of pounds worth of timber rotting on the ground, and I have given the subject of preventing this lamentable waste some consideration.

'There can be no doubt that particular kinds of woods come to maturity at certain seasons of the year, and that the indiscriminate felling of all these at all periods of the year tends much to injure the forests, and to create this waste. Now I would respectfully suggest that the Government should ascertain by observation the time when the woods most in demand, such as ironwood, stinkwood, yellowwod, and those used principally for mechanical purposes, come to perfection (this might, I presume, be easily done by the Colonial Botanist); that the Legislature should pass an Act fixing (under a penalty for a breach thereof) the months in which the different kinds of wood should be felled; and that those trees pointed out by the rangers should be cut down, and none other. I have said that our Colonial woods do not bear a high

character. This may be not altogether the fault of either the timber or the exporter; the wood-cutter can do much towards raising their character. When the contract for the supply of 5000 railway sleepers was taken it was found that sleepers were brought in of a kind of wood totally unfit for the purpose. I informed the Colonial railway engineer of this, and the railway company, at my suggestion, appointed an experienced person here to inspect all sleepers brought for shipment. In this case the wood-cutter was clearly to blame, for the wood (buikenwood) sought to be palmed off on the railway company is known to be utterly worthless. During the year a piece of forest has been opened at Kruis River, from which telegraph poles have been cut for the electric teelgraph through Lange Kloof. The number removed was 530. These were a free gift to the contractor.'

A similar grant on a larger scale is reported that year by the Conservator of forests in George. He says:—'The forests remain from year to year almost in *statu quo*, for the want of better access; and the revenue decreases. During the year 3,989 poles of superior quality have been furnished from these forests for the electric telegraph line, upon free permits in favour of the company's contractors. They have consisted almost exclusively of young yellowwood trees, but chiefly taken from portions of the forests where they were growing too densely, and thus without deteriorating the forests. The value of these poles by the load, at the license price, would have been a few shillings less than £100.'

In the report of the Conservator of forests in the electoral division of Uitenhage, dated 14th January, 1863, there occurs the following statement:—'I beg most respectfully to bring to your notice the irregular manner in which Mr Mackenzie, the telegraph contractor's agent, is getting his poles cut for the line. I understand that this gentleman entered into a contract with a Mr Plackett for the supply of one thousand and fifty poles, two and a half inches in diameter. On the completion of the contract Mr Mackenzie remarked that two and a half inches was too thin, and that he would enter into a fresh contract with Mr Plackett for the supply of the same number

of poles, to be three inches in diameter, *but the contractor was to take over the one thousand and fifty poles already cut, as part payment.* This appears to me a gross abuse of the privilege to cut the poles free of license fee, and I have instructed the ranger not to allow any poles to be cut under this new contract unless the license fee (ten shillings per forty) be previously paid. May I request that you will be pleased to give me instructions on this subject.'

An abstract of the report of the management of the forests in this district for the following year shows that licenses had been granted for the removal of eighteen loads of telegraph poles from the Zitzikamma free; and from the abstract of reports for 1865 it appears that again licenses had been granted for the removal of four loads of telegraph poles free from the forests of Klein and Van Staden Rivers.

What was thus done in destroying the forests in connection with the erection of telegraphs was subsequently done upon a scale of comparatively gigantic proportions in connection with the construction of railways; and in the one case and in the other the waste was not confined to the removal of the trees made use of, for the felling and bringing out of one might entail the destruction of others, and in the one case, as in the other, occasionally the wood supplied was refused.

Mention has been made of 5000 railway sleepers having been found unsuitable for the purpose for which they were required. It does not appear by whom the loss occasioned by the felling of the trees yielding these was borne: possibly the wood-cutters may have lost payment for their work, but this does not appear; and probably the community lost the value of the trees felled, and that of others injured in the felling and bringing out of these. But a greater unnecessary destruction of trees occurred some years later, when 600,000 railway sleepers were found unsuitable; and the occurrence gave rise to unpleasant remarks, impunging the character of a high Government official, by whom, on the part of the Government, the contract had been made, by whom the matter was brought under the attention of a Select Committee appointed by order of the House of

Assembly, dated 9th May, 1882, to consider the question of the relative value of yellowwood sleepers as compared with imported sleepers for Colonial railway purposes—the charges against his integrity having been made by a public newspaper, ostensibly on information furnished by some one present at meetings of the Committee.

In reference to this matter the Committee embodied in their report the following statement:—'Pointed reference having been made to the late Commissioner of Crown Lands and Public Works in connection with this investigation, the Committee consider it but right to place on record that not a shadow of suspicion that could justify the slightest imputation of improper motives has attached to that gentleman; it being clear to every member of this Committee that he was influenced solely by the consideration set forth in the first paragraph in this report.' The paragraph was as follows:—'The Committee having taken evidence, and finally considered the matter referred to them, have to report:—1. That they are of opinion that the rapid and alarming decay of some portions of the creosoted sleepers, coupled with a desire to develop Colonial industry, induced the late Commissioner of Public Works to look to Colonial sources for the supply of sleepers required.'

In a letter to the Chairman, under date of 30th May, 1882, he detailed the considerations by which he had been led to take the successive steps taken in the matter. But while everything seems to have been done in good faith there remained the loss sustained in the wood, and the felling of the trees by which it was yielded. The sleepers were found, when required, to be unfit for use, being rotten. It was suggested that the rotting of many of them while stacked for storage till needed might be attributable to their having been felled at an improper season of the year, notwithstanding precautions which had been adopted against this being done. But whatever the cause or occasion, the loss to the Colony was by no means trifling. The number of sleepers in question was 600,000. In regard to one portion of them, in giving evidence before the Committee, the Honourable J. X. Merriman, then Commissioner of Crown Lands and Public Works, said in reply to Q. 23,

'Therefore if we are not to be guided by the reports of the engineers, and in spite of their reports carry this contract out, we might have 500,000 sleepers of no use, and at a cost of £100,000? I suppose that would be practically the result of it.'

It has been stated before that seventy-eight free licenses were granted in 1876 for cutting telegraph poles and other public works, and that while the amount of license fees was £1910, the estimated value of the wood removed, of which details are given, was £14,338. While there are no data given to justify a supposition that the proportional value of the wood felled in this case exceeded to the same extent the amount of license fee, enough appears to suggest comparison.

SECTION III.—THE NON-ENFORCEMENT OF LAWS OF THE COLONY, DESIGNED SPECIALLY FOR THE PREVENTION OF WASTE SIMILAR TO MUCH WHICH WAS CARRIED ON EXTENSIVELY IN THE CROWN FORESTS.

There were laws existent which, if enforced, must have prevented much waste and destruction such as I saw going on in the Crown forests, and of which I heard more from others, I refer more particularly to Acts passed in 1859 entitled *the Bush and Herbage Act*, and another in regard to *Bush Fires*.

The Act of Parliament in regard to the punishment of forest depredation is stringent and explicit; but evidence has been adduced which shows that it has not been satisfactorily enforced. The cases mentioned in evidence cited in the First Part of this volume are numerous and varied, so numerous and varied as to suggest that administrators, managers, and watchmen, must all have been dealing slackly with such matters, and in a very different manner from what educated foresters would have done, or from what has been done since the forests came under the administration and management of such officials.

I have given illustrations of the stealing and cheating practised in connection with the felling of trees under licenses issued by the authorities; I refer here more to what was done in thieving without the covert of any license.

In the volume on the *Hydrology of South Africa*, in treating of

the destruction of forests, and consequent desiccation, I have had occasion to cite [*ante* p. 173] the testimony of Mr Pullen, a zealous and patriotic forest warder in the district of Van Staden's River, and similar testimony of the Hon. Mr Barrington, in regard to extensive thieving; this, and the evidence collected by Captain Harison and Mr Bain, cited above [*ante* p. 149, &c.], is all in keeping with what I have stated in my Memoir submitted to the Government in 1863 [*ante* p. 89, &c.].

Section IV.—The Non-Enforcement of the Law of the Colony in regard to Bush Fires.

It was the disastrous consequences of bush fires which first arrested my attention in entering upon my professional duties at the Cape, and led me to advocate the conservation and extension of the forests as a means of counteraction. The history of South Africa, from its discovery by Vasco de Gama in 1495, to the present time, tells of the practice of clearing the land of old bush and herbage by fire. From the smoke seen from the ship the land was named by the discoverer Terra de fume; the practice of the natives in those days has been continued by the European colonists; and old remains of charred roots preserved in the ground show that forests have been extensively destroyed by fires.

The law in regard to bush fires was explicit.

But I never heard of a case of its being enforced. This apparent negligence was defended. It was alleged that I was mistaken in regard to effects which the practice had upon the humidity of the climate, for the immediate effects of an extensive veldt fire was to produce copious falls of rain. It was alleged that the practice was absolutely necessary to the rural prosperity of the Colony. I was told that no one would lodge with the authorities information against a neighbour who had kindled a veldt fire which had spread beyond his contract; and while many extensive fires were attributable to picnic parties not taking the trouble to extinguish fires which they had kindled for the cooking of their provisions, or smokers throwing on the ground the burning match with which they had lit their pipes,

or the end of a cigar still lit, it was only to get ill-will, and perhaps serious usage, and do no good, to inform the authorities, for again and again one heard the Attorney-General of the Colony had refused to prosecute. Such was the credible information supplied to me.

Appended to the report of the Colonial Botanist for 1864, folio 102-123, is a letter in reply to many such objections, entitled: 'Letter to F. Tudhope, Esq., Grahamstown, on the question whether good or evil preponderates in the results obtained by burning the veldt, &c.'

In the Act for more effectually preventing the unlawful cutting down or otherwise destroying the forests and herbage in these territories it is stated:—

'Every person who shall wilfully, or by gross carelessness, set fire to, or kindle any fire which by spreading shall set fire to any tree, bush, brushwood, underwood, or grass, not his property, shall be deemed to be guilty of the crime of contravening this section of this Act, and shall, upon conviction, be liable to the like penalties as are contained in the first section.

'Every such person as aforesaid, whether prosecuted or not prosecuted, shall be liable in a civil action, to be instituted by the party aggrieved, to pay and make good the amount of all damage done by such cutting down or burning.

'The penalties defined by the first section of this Act are a fine not exceeding One Hundred Pounds, and in case such fine shall not be paid, to imprisonment with or without hard labour, for any period not exceeding six months, or to such fine and such imprisonment, or to such imprisonment without such fine.' But while I was in the Colony (1863-1866) this was little better than a dead letter.

The non-enforcement of the Act I found attributed to its being in advance of public opinion in the Colony at the time, and I believe this to have been the case; but the fact of the occurrence of preventible fires destructive to extensive forests I in turn attribute to those entrusted with the management, or rather the administration of the forests, not being fitted to look at such matters as they are regarded by educated foresters.

And the devastations occasioned thus are, I presume, far beyond what most of the colonists have any conception of. Of this some illustrative details have been given in the volume entitled *Hydrology of South Africa*, pp. 175-194.

Much of the difference between the results obtained from the management of the forests under the old regime and under the new regime is accounted for by the abandonment in the exploitation of these wasteful usages. Jardinage, though not absolutely abandoned, has been practised only in the removal of aged trees with a view to secure approximately a uniformity of condition in the composition of plots, or sections of forests, with a view to subsequent uniformity of treatment, which for jardinage has been substituted in exploitation what is known as the scientific method, or natural method, and is so designated in some lands. This is essentially conservative, and secures, as has been intimated, simultaneously an amelioration of the condition of the forest, a sustained supply of wood or timber not only for years and decades, but for centuries, and a natural reproduction of the forest when it is cleared. These are the objects contemplated and aimed at, and the preceding narrative indicates results in accordance with these co-related objects having been obtained.

By this is superseded the practice of issuing licenses to wood-cutters to select and fell trees for themselves, and also the practice of making concessions. It is long since this practice was found in Germany and France to be utterly incompatible with a proper management of the forests; and in India, with introduction of the advanced forest economy of the day into the management of forests there the practice was early condemned and abandoned.

No one is allowed to fell the trees required for the concession by the forest officials, and the regular market prices for what is delivered is charged against Government, and credit is taken for this in the accounts of the forest management—its outlay and its return. But it is the waste of forest produce thus occasioned with which we are here concerned. Details of such waste in Russia I have given in a volume entitled *Forests and*

Forestry in Northern Russia, and Lands Beyond; and in another entitled *Forestry in the Mining Districts of the Ural Mountains in Eastern Russia,* where every precaution, such as marking by a skilled forest official what trees alone may be felled, and an official examination of all wood brought out from the forests is presented.

A like usage was formerly practised in India, but as has been stated, shortly after the existing improved forest service was organised it was found expedient that when the Government granted concessions of wood from Crown forests free of charge an order on the Forest Department should be given for what was required, and that they should fell and deliver the wood, charging the Government for the same; and under the new regime at the Cape some such arrangement has been adopted, preventing the unnecessary waste and devastation of the forests previously thus occasioned. And when the forest products are required by a department of the Government, the Admiralty, or the army, it is supplied by the Forest Department according to order, and charged against the Department as it would be against any purchaser; by which arrangement the accounts of income and outlay of each department are kept complete in themselves, and may show at any time the balance which tells of deficit or of excess.

And laws relating to forest trees and forest depredation are strictly enforced, instruction in forms of proscess being part of the preparation for the discharge of the duties with which the forester on the Continent of Europe is, according to his office, entrusted; and the laws, instead of being relaxed, are modified or amended to meet new forms of the evils to which they relate as these manifest themselves.

CHAPTER II.

FOREST ADMINISTRATION.

THE difference of forest administration under the old regime and under the new is not less marked than is the difference of forest exploitation under the two. Under the old regime the administration of the management of the forests was entrusted to civil commissioners, district magistrates, veldt cornets, and others, some of them manifesting a very hearty interest in the work with which they were entrusted—one, Captain Harison, manifesting an interest which could not be surpassed, and another, a subordinate of his, Mr Pullen, deserving of similar commendation as a forest warder—but none of them were specially trained for the discharge of their professional duties in the forest; under the new regime the administration of the forests is entrusted, I had almost said exclusively, to professional foresters specially prepared for the work by an appropriate education, instruction, and training. To some extent I question the propriety of the use of the phrase I have used,—the difference of forest administration under the old regime and under the new: for it might be said with propriety that this difference was the essential difference between the two regimes to which may be attributed the differences referred to in the preceding chapter, these being actually results of this.

It was on the ground of the Count de Vasselot's appropriate education, instruction, and training, in the practical application of the advanced forest science of the day, that he was selected and invited to the Colony, and entrusted with the superintendence of the forests of the Colony; and apparently on similar grounds have more than one of his present subordinates received the appointments which they hold. What that preparation must have been is indicated by reports which I have cited, and what the requirements for similar employment in Europe I have detailed in a chapter entitled Require-

ments for admission into the forest service in German States, in which there does not exist Schools of Forestry, in a volume entitled *Schools of Forestry in Germany.*

It is as varied and comprehensive as that followed in Britain as a preparation for any professional career in which our countrymen engage—those for the ministry in the Presbyterian churches in Scotland, and for the practice of medicine, not excepted. And the results are seen in the details given in the Second Part of this volume, while the results of the other arrangement are seen in details given in the First Part of the volume, and in the immediately preceding chapter.

It excites no surprise in me that where the administration and management of forests have been assigned to others than those who by special education, instruction, and training, have been prepared for the discharge of duties involved in such work, reckless exploitation by jardinage, with concessions of wood for works of public utility, an imperfect enforcement of the law against forest thefts, and non-enforcement of the law in regard to field fires, should have become characteristic of the forest management of the Colony as it did under the old regime.

The regime of forest management formerly followed was professedly that of forest conservation; and this should be born in mind in forming an opinion in regard to what has happened. For conservation of forests there may not be required the professional education, instruction, and training, required for the economic exploitation of them; but the results show that the conservation of the forests was not secured where professedly this was what was sought; while it was secured together with an amelioration of the state of the forests under trained and instructed foresters charged with the economic management of them. The measures of conservation adopted under the old regime appear to have been limited to measures to restrict the destruction of them by fire, the devastation of them by theft, and the removal of trees other than were actually required for economic purposes. But these measures all of them proved to be such as were adopted in vain. Thus was it with the restriction of felling to what was

covered by a formal license. This naturally if not also necessarily led to the exploitation of them on the method spoken of as reckless jardinage.

In view of the waste and destruction of forests under this regime, which was professedly conservative, and of the conservation and replenishment and extension of them under the new regime, which is professedly and avowedly designed for the exploitation of them, we find something like a counterpart to what is said by the Apostle Paul of the Gentiles and of the Jews: 'Israel which followed after the law of righteousness hath not attained to the law of righteousness; but the Gentles which followed not after righteousness have attained to righteousness.'

It is the case that a precedent for entrusting the wardership of a State forest to other than a trained and educated forester is presented in the administration of woods and forests in England. In a volume entitled *The Forests of England, and the Management of them in Bye-gone Times*, I have had occasion to state :—

'In 1711 Dean Swift visited Windsor, and wrote to Stella how much the Long Walk surprised him. The Duchess of Marlborough was then the ranger, and so continued till her death in 1744, setting the Court at defiance in a very termagant fashion. Among her numerous complaints she declares she is out of pocket keeping up the lodges and paying the keepers, and "all she got was a few Welsh nuts to eat and the grazing of some cows." At the age of eighty-four she is still busy about the park, and often "in the vapours against knaves and fools, both of which," she says, "I hate." She complains, too, that the Duke of Albans, Constable of the Castle, "besieged her in both parks," and broke open a door of Cranborne Lodge without her leave, for which offence she forbade his driving through the Park. "I have forbid it," she writes to the Duke of Newcastle. "He urges a necessity for it on account of his supervising the fortifications—a term in my mind extremely odd and ridiculous. If he means by it the ditch that is inside the Castle, I am so far from desiring to prevent the constable

from doing his duty in his military capacity, and putting the place in a proper condition of defence, that"—and here she contemptuously promises that her keepers, or "any other engineers," shall attend him when he pleases; but she sees "no immediate probability of an attack."

'The Duchess of Marlborough succeeded William, Earl of Portland, in the rangership in 1722, and continued in that office until her death in 1744. About the year 1746 H.R.H. William, Duke of Cumberland, was appointed ranger. In 1766 he was succeeded by Henry Frederick, Duke of Cumberland. On his death, in 1791, King George III. took the rangership into his own hands, and appointed as deputy, Major-General William Harcourt. In 1830, King William IV. became ranger, with Sir W. H. Freemantle as deputy; and on his death, in 1850, Major-General Seymour was appointed deputy-ranger.

'In 1850 the Board of Woods and Forests, which had been combined with that of Works and Public Buildings, was separated from this Board, and Windsor Forest and Park came under the sole charge of the Hon. Charles Gore.

'The Prince Consort, immediately after Her Majesty's marriage in 1840, became ranger, and held the office till his death in 1861. The present control of the management of Windsor Park rests with the ranger, H.R.H. Prince Christian. Colonel the Hon. A. Liddel is deputy-ranger, and the Commissioners of Woods and Forests have charge, on behalf of that Department, of all matters connected with the estate.'

The present administrators are not responsible for what I am about to state; but the system is. I quote again from the volume cited.

'Windsor Park is maintained as a royal demesne for the enjoyment of Her Majesty and her subjects, and with this in view, more attention is given in the culture of the trees to what will minister to pleasure and ornament, than to the procuring of pecuniary profit for the sale of forest products.

'There were rights of common enjoyed by many, and it is alleged that during the two hundred years comprised between the commencement of the seventeenth century and that of the present, encroachments were constantly being made; and what

with these encroachments on the one hand, and depredations by various persons who claimed rights, the Lord Chief-Justice in Eyre, with whom it lay to prosecute all offenders against forest laws, had no little trouble.

'The claims advanced were of the most extravagant character. The rights were ill-defined, and they seemed to extend over much if not over the whole area of the forest. Silvanus Taylor, in his treatise entitled *Common Good*, dedicated to Parliament in 1652, when a sixth of the land was in common, advised division and allotment. This was ultimately done, but not until 160 years after it was recommended by him—recommended with the quaint remark "not that the commoners would work on their own allotments; for while the parish has to maintain them they will not work."

'Taylor does not appear to have had a very high opinion of the commoners in his day, and as things were then so were they to the end; but it should be borne in mind in judging them that they had rights, and these rights they were maintaining. In the *History of Windsor Great Park and Forest*, by Mr Menzies, the author tells:—"An old commoner has described to me, with evident self-congratulation, how, one moonlight night on Christmas Eve, when the forest officers were tapping their elder wine (a custom which still exists), and not likely to disturb him, he worked all night long, and had a quarter of an acre added to his land before morning. A moonlight night was the season for such operations; if a commoner could only build himself a hut of turf, and have a fire lighted and a *pot boiled* on the rudest chimney, the hut became established as a house—was, in fact, his "castle," and was wholly unassailable except by regular process of law, which the forest officers frequently declined to institute; the trouble was immense, there was no remuneration, and the next moonlight night saw the estate restored. If, however, the pot had not been boiled on the hearth, the forest officers might proceed without ceremony to pull the place down.

'A short time since the Crown purchased a cottage and garden near the park, and on enquiring for the title the following was the reply of the owner:—"You see, sir, my

wife's father as was, so I have been told, lived in another house near this about seventy or eighty years agone, and there was a piece of waste land, as was part o' the common that was handy, and so he first plants taturs on it, and then he got some bricks and some sods, and he put up a bit of a place to take shelter in, and at last he got to live in it, and there was a deal o' bother made about it one way and the other; but he was servant to a gentleman as was a magistrate in the neighbourhood, and he was friendly to the poor people, and said the land was of no use to nobody, and so he kep' it, and when I married his daughter I came to live in it."'

More numerous and serious evils so produced manifested themselves in France in the first half of the seventeenth century, details of which are given by me in a volume entitled *French Forest Ordinance of* 1669, *with Historical Sketch of Previous Treatment of Forests in France*, pp. 13-341. In reprints of articles which appeared in the *Journal of Forestry* in October and November, 1879, and March, 1880, issued under the title 'Glances at Forestry in France in 1660 and 1880,' there is supplied in contrast with the waste and robbery of the former period, under the administration of civil and ecclesiastical authorities, illustrations of the energy, enterprise, and beneficial results to the country with which the forests were being maintained, replenished, extended, and exploited, under the administration of a staff of central detached forest officials of high rank. And, in accordance with this, on a lesser scale, is the contrast presented in preceding pages of the results following the management of the forests in the Colony under the old regime and under the new, of which this is an essential distinguishing characteristic.

CHAPTER III.

ADMINISTRATIVE EXPENDITURE.

I CONSIDER that the satisfactory results obtained under the regime of forest administration and management of new Crown forests at the Cape of Good Hope ought to be reckoned normal, and the waste and destruction of the Crown forests of the Colony under the old regime an evil, an evil attributable to the administration and management of them being committed to men who had not the special education, instruction, and training required for the work. Enquiring into the cause or occasion of this having been done, I consider that it may be attributable to the parsimony with which the management of the forests was conducted under the old regime; and this again may be attributable to an utter unconsciousness on the part of the Government and of the community of the importance of the interests involved.

For three thousand years it has been a proverb among the Jews: There is that scattereth and yet increaseth; and there is that withholdeth more than is meet, and it tendeth to poverty. And some 300 years after this was embodied amongst the proverbs of Solomon, another Hebrew writer, held in the highest estimation throughout Christendom, wrote: 'The liberal deviseth liberal things; and by liberal things shall he be established.' The truth of both finds an illustration in the preceding narrative. A parsimonious economy under the old regime reduced the free revenue from the Crown forests of the Colony to £250 in 1863; a more liberal expenditure under the new regime raised the gross revenue in two years to £7680 14s 6d in 1883, with an explicit official report that the forests of the Colony, properly managed, should produce an annual revenue of £235,000; and much of the increased revenue was expended in preliminary operations tending towards the accomplishment of this, in the replenishing of exhausted forests, and in the creation of extensive plantations, all which might be considered

profitable investments to bring in in due time profitable pecuniary returns. Nor was the administrative expenditure unreasonable or profuse

In illustration, in so far as this can be secured by comparisons, I may state that while the allowance made to me when there as Colonial Botanist was, as has been stated, £300 a-year of salary, with £100 for travelling expenses, my expenses during the four years that I was so employed, including the removal of myself and family to and from the Colony, amounted to £700 per annum. According to the report made to Parliament by the Government on the announcement of the engagement of Count de Vasselot as inspector of Crown forests in the Colony the engagement was for a specified number of years, with a salary of £700, and an allowance of £100 a-year for house rent; and in reply to complaints then made the Colonial Secretary stated that they had found it impracticable to procure the services of any qualified agent at less expense. At the time when this arrangement was made there was on the staff of officials of Government a Colonial Hydraulic Engineer, for whose appointment Parliament had made a provision of £1000 a-year; he was also allowed to receive fees for professional advice given by him to Colonists requiring this, and a title to a handsome retiring allowance for life, which he now enjoys. This comparatively liberal allowance was not in excess of what was paid to civil engineers engaged in connection with the construction, and maintainance, and management of railways, and breakwaters, and docks, in the Colony; and it was far short of an equivalent to the salaries and allowances made to trained British officers in the forest service in India; and the results show that the money spent on the forest service has been spent profitably for the Colony.

Under the old regime there was not such a liberal administrative expenditure; and the corresponding result followed. The more parsimonious economy provided only for the maintenance of an inadequate staff of officials who were altogether untrained in the management of forests in accordance with the advanced forest science and usages of the day, and were insufficient in numbers to prevent gross and

flagrant abuses. And to this is attributable much of the loss sustained by the Colony in forest produce under the old regime.

At the time I held the appointment of Colonial Botanist there were in the Colony colonists and officials connected with the conservation of the forests taking much interest in the conservation, extension, and economic exploitation of the forests. Of these there were several deserving of high commendation for their patriotism, their schemes, and their achievements; but I do not know of one resident in the Colony who had been trained as a forester in Britain; I only know of one, a gentleman from Belgium, who had ever seen a School of Forestry; and only one, a colonel of engineers, who had seen the improved forestry in India. There could only be obtained as conservators of forests, gentlemen untrained in the advanced forest economy of the day; and from the desire of saving expense only a limited number of these were appointed, some of them with very small salaries indeed. And the staff of rangers or warders was also inadequate to meet the requirements of the case, insufficient even in point of numbers to prevent the occurrence and extensive spread of fires, to prevent thieving, and to prevent dishonest practices under licenses to fell wood. In the testimony submitted to the Commissioners appointed in 1886 to enquire into the management of the forests cited above (*ante* p. 159) is a statement to the effect that one Conservator had visited the forests but twice during a period of about five years, and had never kept a horse, till he bought one within three or four days of this testimony being given.

No one acquainted with the requirements of modern forest service will say that conservancy so conducted could be efficient. Nor would any one be more ready to admit this than the Conservator referred to. I knew him personally. He voluntarily accompanied me on visits to the forests then under his charge; and he manifested a most hearty interest in the conservation and exploitation of the forests; but the system is at fault. In the evidence collected by the Commissioners, Mr Robert Atkinson, a ranger in these forests, testified—'I have been ranger of Crown forests for the last twenty-one years. I

receive £120 as salary, and £25 for a horse. I visit the forests in my ward about once a week, and I keep two horses for the due performance of my duty. . . . My ward is about forty-five miles in extent, and the work places are scattered.'

While such was the salary and allowance deemed justly due to a subordinate official, this gentleman, John Blake, Esq., the Conservator and Civil Commissioner of Knysna, when examined, said,—'I have been Conservator since February, 1863. I receive £82 [!] a-year as an allowance for the performance of the same. I have always hired horses for the purpose till the other day, when I bought a horse. During my five years of office I have visited the forests to the west twice, but the main forests to the Vlugt I have visited often. . . . I would further gladly resign £50 per annum of my allowance as Conservator towards the appointment of another ranger.' This speaks the spirit of the man.

The Knysna forests, the forests of which he was Conservator, are the most extensive in the Colony of the Cape of Good Hope, but the conservatorship of them was merely an office tacked on to that of the Civil Commissioner, with an allowance of £82, without any provision for horse hire or forage, though one ward alone was fifty-five miles in extent, and the warder had a salary of £120 per annum, and an allowance of £25 for a horse!

Adjacent, if not conterminous, with the forests of the Knysna, are the forests of the district of George, and there a similar arrangement was made.

James Fichat, Esq., Civil Commissioner of the division, and Conservator of forests, a gentleman taking a hearty interest in the forests, as did his predecessor before him, the Hon. C. Davidson, on being examined by the Commissioners said,—'I have been Conservator since 1865, and received an allowance of £54 [!] per annum for the due discharge of my duties. I have two rangers under me. I have visited the forests of ward No. 1 about every two months. Ward No. 2 is in part closed, and I did not visit it, but I sent Mr Harold, my clerk, and also the ranger of No. 1. The nearer side of ward No. 2 I

have visited three or four times in the year. The state of my health would not allow of my riding very far. I have always kept two horses for the forest work, and when without, I have hired them.'

The allowance made to Mr Atkinson for keeping one horse was £25; at this rate the allowance for keeping two would be £50, which sum deducted from £54, leaves £4 as a salary, or fee, or gratuity, for discharging the duties of conservatorship!

It appears to me that designedly in the arrangements consequent upon the closing of the forests, and the sale of forest lots, and even on the re-opening of the forests for the felling of wood upon licenses issued, the watching of the forests was thrown upon the warders, and the Civil Commissioners were appointed conservators solely as media of communication between the Government and the warders or rangers under their supervision, and to issue several licenses, with a small salary attached to this office to cover outlay in the discharge of its duties, and remunerate them for the comparatively light work thus imposed upon them; and that they faithfully did all that was expected of them. Whether there was a good arrangement is another question. I have a very strong feeling against it; but I fully justify all that I know to have been done, and to have been left undone, by the incumbents in the circumstances: of the working of this system there were those who could speak from what they had seen, and their testimony has been cited.

As I have intimated, I found amongst the Conservators gentlemen giving zeal, and energy, and thought, and labour, to the efficient discharge of the functions of their office, without pausing to measure these by the emoluments which this brought to them, and I found men—why not say gentlemen?—like minded amongst the subordinate officials. I may cite in illustration, Mr Pullen, the forest ranger at that time at Van Staden's River, having charge of forests included within a circuit of three hundred miles, which circuit he was required by his duty, if not by express injunction, to make, if I mistake

not, four times a year. Having heard of his enthusiastic interest in the conservation of the forests under his charge, I wrote to him requesting his assistance in collecting specimens of all our forest timbers as a means of making better known what products the Colony might be made to yield. He at once replied, expressing his approval of the measure, and his readiness to co-operate with me in carrying the proposal into effect; but in reference to the expense which the carrying out of the measure would entail, he wrote to me:—'It could not be anticipated for one moment that the rangers here could be at the trouble and expense, or occupy their full time in such an undertaking, for their stipend is, in some cases, merely nominal. Personally, I am only allowed forty [fifty ?] pounds per annum, which is considered forage allowance, and I can say that my inspection, riding, and labour, is more onerous than any other in the province, for this reason—the forests under my supervision are so scattered, and the distance from one end of the forest ward to the other so great and so difficult to traverse—being stony, sandy, bushy, and precipitous. It is true I do not issue so many licenses annually, but that results in some measure from private individuals claiming Government land as their private property. I cannot compel these men to take out licenses, nor can I obstruct their depredations, for Government delays to get the land surveyed, and prosecution is impracticable.'

This led to further correspondence with me on the subject, and in a letter he subsequently wrote to me in regard to the specimens desired:—'I shall collect the whole at my own expense,' and he added, apparently in vindication of the hesitancy he had previously manifested—'Just fancy, since I have been ranger, I have only once been supplied with stationery, and that foolscap barely sufficient for one weeks' correspondence!'

I found nothing like uniformity in the amount of salary paid to the forest warders. The diversity of salary and allowance for horses kept for service was great; and, as might be expected, the attention given to the duties of the office varied greatly.

Malversations of office were not unknown; and it was not without reason that the Commissioners appointed in 1868 recommended that the officers should be better paid, but reduced in number, adding: 'the duties will be heavier and more constant. In fact a forest ranger, like a constable, should be always on duty.' From the case being otherwise, the Colony suffered much. At the same time, I must remark, it was not the worst paid who were the most guilty.

In contrast with the case of Mr Pullen, are the following:— In one of the forests visited by the Commissioners there were two rangers with a salary of £90 each, and half the nett proceeds of sale of seizures. Of these they found that one was under suspension for his conduct in connection with a case of robbery, in which the Conservator recommended the acquital of the culprit, mainly on the ground of the careless way in which the conservation of the forests was attended to; and the other was linesman to the telegraph company.

One Civil Commissioner, District Magistrate, and Conservator of forests, had under his direction three forest rangers, to one of whom one was allowed—

As forest ranger's salary, ...	£120
As forest ranger's forage, ...	25
As secretary of divisional council, ...	36
As postmaster at nnrside, ...	3
In all, ...	£184

Together with a share of proceeds of sales of seizures, and with commission on stamps sold as postmaster. Of him apparently the Commissioners reported that his wife was part proprietor of a private forest in full working!

Another had a salary of £120, with a share of proceeds of sale of seizures. Of him apparently it was that the Commissioners reported that he was an old public servant, and a cripple, with no allowance for forage, though his ward was quite as extensive as the other!

And another had a salary of £75, with a share of proceeds of sales of seizures, but with no allowance for forage.

In another forest, the best managed of all brought under my notice, that of the Zitzikamma, then under the charge of

Captain Harison as Conservator, it was otherwise. In his report for 1861 Captain Harison reports :—'In the Zitzikamma the scarcity of provisions there are severely felt. Supplies are brought to me from Port Elizabeth, a distance of 120 miles, but the ranger and constable are often without bread.'

In his report for 1862 he writes :—'I would beg to draw attention to the small salary (£60, and £25 horse allowance per annum) attached to the office of ranger in the Zitzikamma. Mr Mortimer Lloyd has now held the appointment for five years, and from the scarcity of provisions has had to endure privations which few would put up with. The duties of the forest entail a great destruction of clothing, and this item alone swallows up a great portion of his salary. The ranger at Olifant's Hoek receives £90, and £25 for house allowance per annum ; his responsibilities are not heavier, and his duties far less. I therefore beg to recommend that the rangership of the Zitzikamma be placed on the same footing as that of Olifant's Hoek.' But nothing appears to have been done, and four years later it is reported '*he is often without bread!*'

Such parsimony was not confined to the forest service.

In one report of the Cape Town Botanic Garden—that for 1859—I find it recorded that there is not an employé of the Garden but might more easily obtain better wages elsewhere; and in another report of that institution—that for 1860—I find it stated :—'The price of labour has increased during the year, and much difficulty is experienced in procuring good workmen for the wages given by the Garden. Skilled labour has always been a want in the institution, the remuneration offered not being sufficient to induce really educated gardeners who may have arrived in the Colony, through the immigration scheme, to accept employment.' And several successive reports of the Commissioners of that Garden, gentlemen who without recompense gave time and thought to its regulation, show that they felt painfully the inadequacy of the means placed at their disposal to meet the expenses necessary for the proper maintenance of such an institution.

These communications breathed a spirit which I believe

animate not a few of those who were then engaged in endeavours to develop the vegetable resources of the Colony. The community has happily secured the services of several whose enthusiasm in their work, or some other cause, has made them thankful for the appointments which they hold, and made them willing to continue discharging for a time the duties of these appointments, though feeling painfully the inadequacy of the salary to enable them to meet, in addition to their personal and family expenditure, the professional expenditure which a more efficient discharge of their duties would render necessary.

It was so with the Superintendent of the Botanic Garden, Cape Town; it was so with the Superintendent of the Botanic Garden, Grahamstown; and it was so with the Overseer of the Government plantations on the Uitflucht sands of the Cape Flats, when I went to the Cape.

The last case referred to illustrates at once the parsimony of the Government, and the spirit of the man. He was in charge of the plantations on the Cape Flats in the vicinity of Cape Town. He was an enthusiast in his work. My attention was early called to what he had effected in fertilising his land at Uitflucht, his little home, by intermixing the sterile sand on the surface with the subsoil of clay. He was met one day coming out from the office of the Colonial Secretary, with compressed lips and a tear in his eye, which he was endeavouring to keep there, as it was unmanly to weep. He was asked in a tone of astonishment: Smith, what is the matter? It was too much for him. The flood gates were opened, and with the tear on his cheek he said: 'Man the nowt frae the ootspan are stravaging and strampling my young plantations, and the Government wunna alloo a shillin to buy 100 palen nails to keep them oot!'

This was in keeping with the grant of six sheets of foolscap in reply to an application for stationery by Mr Pullen, a man spending his energy in warding the forest from pure love of the work, on £50 a year, without even allowance for forage for his horse; and not very dissimilar were the cases of the superintendents of the Botanic Gardens referred to.

I do not take upon me to apply to such cases the warning

trumpeted forth by the Apostle James: 'Behold the hire of the labourers who have reaped down your fields, which is of you kept back by fraud, crieth; and the cries of them which have reaped are entered into the ears of the Lord of Sabaoth.' But there is a principle underlying this, and upon which, consciously or unconsciously, it is based, which is equally applicable to the case in hand as to the case referred to by the Apostle. And in in the narrative given in the First Part of this volume may be read the consequences.

CONCLUSION.

In view of what has been advanced, I resume the remarks made in the introduction to this volume, and state as the conclusion which I consider warranted :

1. That the denudation of extensive districts in South Africa of primæval forests is attributable to the reckless exploitation of those forests by natives and by colonists, on the old and extensively practised method known in forest science as *jardinage*, and to extensive fires originating generally from the burning of grass or bush with a view to secure a new and more succulent crop.

2. That the waste of Crown forests in the Colony of the Cape of Good Hope is attributable to the administration and management of those forests being committed to civil commissioners, district magistrates, veldt cornets, and others, destitute of appropriate training for the efficient discharge of such functions in accordance with the advanced requirements of the day; while the existing more satisfactory condition of the Crown forests of the Colony, and of the forest service, is attributable to the administration and management of the forests having been committed to professional foresters who have passed through an appropriate preparation for the work by education, training, and instruction, in the advanced forest economy of the day, and the adoption under them of the most approved method of exploitation based on the advanced forest science of the day. And,

3. That many of the defects of the old regime are attributable to parsimony in what related to the conservation and exploitation of the forests resulting in a great measure form ignorance of the pecuniary value of the forests, and of the importance of the existence of forests to the well-being of the Colony, a parsimony, which results obtained under the new regime show, may have been actually detrimental to the interests of the community.

This volume treats of the exploitation and management of Crown forests at the Cape of Good Hope, under the old regime and under the new. Corresponding conclusions might be drawn from similar accounts of sylviculture in the Colony, under the old regime and the new; but the discussion of this would require a volume for itself. One has been prepared, and it will be published should circumstances arise justifying the expense of publication.

ADDENDUM I.—MEMORIAL TO THE LEGISLATIVE ASSEMBLY OF THE COLONY OF THE CAPE OF GOOD HOPE RELATIVE TO FORESTRY.

TO THE HONOURABLE THE LEGISLATIVE ASSEMBLY OF THE COLONY OF THE CAPE OF GOOD HOPE, THE MEMORIAL OF JOHN CROUMBIE BROWN, LL.D., FORMERLY COLONIAL BOTANIST,

RESPECTFULLY SHOWETH,—

That in giving evidence before a Select Committee of the Legislative Council to consider the Colonial Botanist's Report in 1865, your Memorialist said in reply to Q. 95—'Thirdly, I recommend the procuring information in regard to the most approved measures of forest economy which are applicable to the management of the forests of this Colony by commissioning some one acquainted with these forests to visit the Forest Schools of Germany, and if it be thought desirable, to visit also the forests in other parts of Europe, and report thereafter what is seen, or is suggested by what is seen there, applicable to the management of forests in this country, whether relating to matters connected with private enterprise or Government control.'

That in accordance with this recommendation the Commissioner of Forests in the United States of America is now visiting the Schools of Forestry in Germany, and forests in Scandanivia, Russia, Austria, France, and other parts of Europe, at the instance and expense of the Federal Government, with instructions to report what he may see applicable to the conservation, exploitation, and extension of forests in America.

That in accordance with the same recommendation your Memorialist has at his own instance and his own expense, since his return to Europe, gone over nearly the same ground, and prepared reports of what he had seen, and placed the same at

the command of the Government in the Colony free of all expense, beyond what might be incurred in making copies of the same.

That in the light of the information thus obtained, and in view of the reported appointment of a Forest Commissioner in the Colony, your Memorialist considers that it would be pecuniarily advantageous to the Colony that the said Commissioner, and also the Commissioner of Crown Lands, the Members of the Legislature, and others, should have access to the following reports prepared by your Memoralist while he was Colonial Botanist at the Cape of Good Hope:—

1. Past and Present Management of Forests in the Colony.
2. South African Trees, Shrubs, and Bushes, described under their English, Dutch, Kaffir, Lethuana, and Hottentot names; with notices designed to present in phraseology intelligible to readers unacquainted with botanic terms what has been learned in regard to the botanic characteristics and natural history of each, and in regard to the economic uses to which it is applied.
3. The Forests and Forest Lands of South Africa, from the Cape of Good Hope to the Zambesi, with details relative to the situation, extent, contents, and condition of each.
4. Arboriculture in South Africa, with details of what has been done, and of what may be done, in planting trees at the Cape of Good Hope, with a view to securing thereby ornamentation, moisture, shelter, fuel, or timber; with notices of the natural history, characteristics, and uses of trees which are being cultivated, or have been recommended for culture, in the Colony.

That abstracts of these reports were appended to a Report of the Colonial Botanist for 1886, which was submitted to Parliament while engaged carrying out sweeping measures of retrenchment, with only the titles of these Reports, and a list of the indigenous trees referred to. But your Memorialist is prepared, and hereby offers, to carry through the the press

ies of the original reports, which are still in his possession; and to do so free of all expense to the Colony beyond what may be charged by the printer for his work, and for paper, and for binding what copies may be desired.

Your Memorialist respectfully petitions your Honourable House to take the premises into consideration; and to avail yourselves of his offer, if it shall appear to you that it would promote the interests of the Colony so to do.

JOHN CROUMBIE BROWN.

HADDINGTON, 13*th September*, 1881.

I have learned that the Memorial was submitted to the House; but of the subsequent disposal of it I know nothing. If any one or more of the community think proper to take up the lapsed offer, and communicate with me, they will find me as ready now as then to carry through the press, on the terms stated, the account I had prepared of the forests of South Africa, since extended to comprise those of the equatorial regions of the Continent, and the accounts I had prepared of the South African trees, shrubs, and bushes, referred to.

ADDENDUM II.—MEMORIAL ADDRESSED TO THE LEGISLATIVE ASSEMBLY OF THE COLONY OF THE CAPE OF GOOD HOPE RELATIVE TO UTILISATION OF RIVERS.

TO THE HONOURABLE THE LEGISLATIVE ASSEMBLY OF THE COLONY OF THE CAPE OF GOOD HOPE, THE MEMORIAL OF JOHN CROUMBIE BROWN, LL.D., FORMERLY COLONIAL BOTANIST,

RESPECTFULLY SHOWETH,—

That appended to a Report made by your Memorialist as Colonial Botanist in 1866, were, together with abstracts of other Memoirs which had then been prepared by him:

1. An abstract of a Memoir on the Hydrology of South Africa, supplying details of the former hydrographic condition of the Cape of Good Hope, and of causes of its present aridity, with suggestions of appropriate remedies for this aridity, and details of the water supply, and facilities for the storage of this.
2. An abstract of a Memoir on the Rivers of South Africa, with notices of inundations by which they are characterised, and of irrigation works by which they might be utilised; of difficulties, physical and others, in the way of this being accomplished; and of the means of overcoming these which are at command.

That, on the publication of the first mentioned Memoir, your Memorialist subsequently expended a sum of money presented to him by some friends, on the conclusion of a short time spent in ministering to a Congregation in Berwick-on-Tweed; and in regard to the second, he offered in a letter to the Commissioner of Crown Lands, under date of 1st October, 1877, to print an addition of it at the expense of the Colony; but it was found that there were no funds available for such an expenditure.

That, since that time, your Memorialist has had under his attention the Hydrology of Spain—a country, the climatical conditions of which closely resembles that of South Africa, and where are in operation appliances like those described in the Memoir in question; that a report on the Aridity of Spain: its causes and remedies, has been prepared by him, and placed by him, along with other reports, at the command of the Government of the Colony; and that, in view of what has been accomplished in Spain, your Memorialist considers that it would be pecuniarly advantageous to the Colony that the Commissioner of Crown Lands and Public Works, the Members of the Legislature, and others, should have access to the information embodied in the Memoir on the Rivers of South Africa, of which an abstract was appended to the report of the Colonial Botanist for 1866, but could not be printed at that time, in consequence of the financial condition of the Colony.

That your Memorialist hereby offers to carry through the press a copy of the said *Memoir on the Rivers of South Africa*, which is in his possession, and to do so free of all expense to the Colony, beyond what may be charged by the printer for his work, and for paper and binding.

Your Memorialist respectfully petitions your Honourable House to take the premises into consideration, and to avail yourselves of his offer, if it appear to you that it would promote the interests of the Colony so to do.

J. C. B.

HADDINGTON, 15*th September*, 1881.

As I have stated in regard to the preceding Memorial, I have learned that the Memorial was submitted to the House; but of the subsequent disposal of it I know nothing. If any one or more of the community think proper to take up the lapsed offer, and communicate with me, they will find me as ready now as then to carry through the press, on the terms stated, the accounts I had prepared of the rivers of South Africa, since extended to comprise those of the equatorial regions of the Continent, and the accounts I had prepared of practical means of utilising their waters.

Addendum III.—Proferred Gift of Works on Modern Forestry to Free Public Libraries in Great Britain and Ireland.

At the meeting of the British Association for the advancement of science, held in Aberdeen in September, the General Committee of that body adopted a resolution that Sir A. Taylor, Professor Bayley Balfour, Dr Croumbie Brown, Dr Cleghorn, and Sir John Lubbock, be a Committee for the purpose of considering whether the condition of our forests and woodlands might not be improved by the establishment of a Forest School. And by three successive Parliaments a Select Committee has been appointed to consider whether by the establishment of a Forest School or otherwise, our woodlands could be rendered more remunerative. By the first of these Parliamentary Committees it was reported, after collecting valuable evidence on the subject:—'Your Committee are of opinion that at this late period of the session it will not be in their power to conclude their investigation; they have therefore agreed to report the evidence already taken to the House, and to recommend that a Committee on the same subject should be appointed in the next session of Parliament.' Shortly thereafter the Parliament was dissolved. The next Parliament adopted the course recommended; but they had just begun to collect evidence when again Parliament was dissolved. They reported as the previous Committee had done; and the present Parliament has likewise appointed a Committee to consider the matter and report.

As a contribution towards the diffusion of information bearing upon the matter thus engaging the attention of the Legislature, I am prepared, on application being made to me by the managers of any Public Free Library in the Kingdom, whether it be so designated or not, to dispatch by rail as a gift to the library, a copy in sheets of any or all of the following works, so far as the copies on hand, after reserving a limited number for any more special demand which may afterwards arise, may permit:—

1. Origin and History of Schools of Forestry in Germany, with Addenda relating to the Desiderated School of Forestry in Britain.

2. The School of Forest Engineers in Spain, indicative of a type for a British School of Forestry.

3. Introduction to the Study of Modern Forest Economy.

4. French Forest Ordinance of 1669, with Historical Sketch of Previous Treatment of Forests in France.

5. The Forests of England, and the Management of them in Bye-Gone Times.

6. Forestry of Norway.

7. Finland—Its Forests and Forest Management.

8. Forestry and Forest Lands in Northern Russia.

9. Forestry in the Mining Districts of the Ural Mountains in Eastern Russia.

10. Forestry in Poland, Lithunia, and the Baltic Provinces of Russia.

The great number of free libraries which are in the country, and the amount of the expenditure which I have already incurred, is my excuse for not offering to deliver the copies bound; but arrangements have been made according to which any may be had bound at a uniform charge of sixpence per volume. I shall hold myself bound by this offer till the close of the year. The books will be sent to applicants in the order in which their applications may be received.

JOHN C. BROWN.

HADDINGTON, 21*st July*, 1887.

FINIS.